

No. 12485

United States
Court of Appeals
for the Ninth Circuit.

LeROY J. LEISHMAN,

Appellant.

vs.

GENERAL MOTORS CORPORATION,

Appellee.

Transcript of Record
In Four Volumes
Volume II
(Pages 329 to 693)

Appeal from the United States District Court,
Southern District of California,
Central Division.

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BERTRAM A. SCHWARZ

called as a witness by and on behalf of the plaintiff, having been first duly sworn, was examined and testified as follows:

The Clerk: Will you please state your name?

The Witness: Bertram A. Schwarz.

Direct Examination

By Mr. Lyon:

Q. What is your name—your full name, please?

A. Bertram A. Schwarz.

Q. How old are you? A. 46.

Q. Where do you reside?

A. Kokomo, Indiana.

Q. And what is your occupation?

A. Chief Engineer of Delco Radio Division of the General Motors Corporation.

Q. How long have you been with General Motors?

A. Since about March, 1936.

Q. And how much of that time has been devoted to the Division that you are now with?

A. The entire time although the Division wasn't formulated, officially as a name, until May or June of 1936.

Q. And what is the business of that Division?

A. The principal business of the Division is to manufacture automobile radio receivers.

Q. And where is that manufacturing carried on?

A. The largest part of it is in Kokomo, Indiana. We also have a factory in Chicago, Illinois.

Q. Prior to going with the General Motors Cor-

(Testimony of Bertram A. Schwarz.)

poration in 1936, with whom were you employed?

A. Immediately prior I was with the Zenith Radio Corporation.

Q. In what capacity?

A. As Chief Engineer of the automobile radio division.

Q. For how long?

A. From 1934 to the end of 1935. No, to the beginning of 1936.

Q. Prior to that by whom were you employed?

A. I was employed in Canada with the DeForest-Crosley Radio Corporation, Limited.

Q. In what capacity?

A. As vice president in charge of engineering.

Q. And what was the business of that company?

A. Manufacturer of radios—household radios was the principal product, although there was also automobile radios.

Q. And during what period of time were you employed [315] by that company?

A. From 1929 to 1934.

Q. And prior to that by whom were you employed?

A. I was employed by the Charles Freshman Company in New York City.

Q. And what was the business of that company?

A. They were a radio manufacturer—a manufacturer of household radios.

Q. And what was your position with that company? A. I was Chief Engineer.

Q. For how long?

(Testimony of Bertram A. Schwarz.)

A. During the year 1929.

Q. And prior to that by whom were you employed?

A. I was employed by the Howard Radio Company of Chicago, Illinois.

Q. In what capacity?

A. As senior electrical engineer. I don't think there was any official title. I assumed the position of Chief Engineer.

Q. What was the business of that company at that time?

A. Manufacturer of household radio sets.

Q. And how long were you with them?

A. I was with them for two years, 1927 and 1928.

Q. And prior to that by whom were you employed? [316]

A. I am not sure of this but in one year I was with two companies, the Gayrod Radio Company of Bellville, New Jersey, and the Colonial Radio Company of Long Island City, New York.

Q. Did you have a school training in engineering? A. Yes, I have.

Q. And did that school training include the subject of machine designing?

A. Yes; that was part of the training.

Q. Now, since you have been out of school as I understand it, you have been in the radio business—I mean by that the business connected with companies manufacturing radio receivers?

A. That is correct.

(Testimony of Bertram A. Schwarz.)

Q. Does your company employ machine designers? A. Yes, in product design.

Q. Are those men engaged in designing radio tuners? A. Yes, they are.

Q. And are they under your supervision and direction? A. Yes, they are.

Q. Have you yourself in the past designed radio tuners? A. Yes, I have.

Q. For the General Motors Corporation?

A. For the General Motors—primarily for General [317] Motors.

Q. And to what extent have you been responsible for the design of the various types of tuners that have been manufactured by your division of General Motors since you have been with that division?

A. I think I have been largely responsible for outlining the needs and the type of tuners and working out some of the major details of them.

Q. And the rest of the fill-in of the design has been done by whom?

A. By mechanical designers under my direction.

Q. Are you acquainted with the type of tuners that are being supplied by the automobile manufacturers with their current automobiles?

A. Yes, I am.

Q. You were here yesterday at the trial and have been here today and you have heard the reference that was made to the automatic tuners of type having an adjustable tappet and rocker. Do you understand what that is?

(Testimony of Bertram A. Schwarz.)

A. Yes, I think I do.

Q. And you have heard the testimony of Mr. Leishman with reference to putting the center of that tappet on center with the centers of the rocker?

A. Yes, I have.

Q. Do you understand what that [318] means?

A. Yes, I do.

Q. Now, with reference to the current models of the Chrysler Corporation, including Plymouth, Dodge, DeSoto and Chrysler, do you know what type of tuners are supplied by the manufacturers of those cars with their current models?

A. Yes, I do.

Q. Is it a type that has an adjustable tappet and rocker? A. No.

Q. What type is it?

A. It is a switch type.

Q. Is it to your knowledge sufficiently accurate in tuning to do a satisfactory job?

A. Yes, I find it is.

Q. Can you answer the same questions as to the current models of the Ford car? A. Yes.

Q. Will you do so?

A. It does not have a tappet and rocker arrangement. It uses an advancing screw and nut and it is quite accurate.

Q. In either case, either the tuners supplied with the Chrysler Corporation models or the Ford, is any use made of this feature of coaxiality that has been referred to by Mr. Leishman? [319]

A. No.

(Testimony of Bertram A. Schwarz.)

The Court: Mr. Schwarz, will you raise your voice a little, please?

The Witness: Yes.

Q. (By Mr. Lyon): Do you know what type of tuner is supplied by the Packard Company with its car? A. Yes, I do.

Q. Is it a type having an adjustable tappet and rocker? A. No, it is not.

Q. What type does it have?

A. It is an advancing nut and screw with no coaxiality and a single bar that is spring-loaded against the nut, similar to the Marvin.

Q. What can you say as to the accuracy of the tuning of that device?

A. The accuracy in tuning we find is satisfactory.

Q. Can you answer the same questions as to the Studebaker cars?

A. Yes. It is the same tuner as the Packard with slightly different arrangement of buttons and knobs.

Q. And with equally satisfactory results?

A. Equally satisfactory accuracy.

Q. Can you answer the same questions as to the Nash car? [320]

A. Yes, sir. It is the same tuner as is used on the Ford with equally satisfactory accuracy.

Q. Can you answer the same question as to the Hudson car?

A. The Hudson car? I am not entirely sure of that.

(Testimony of Bertram A. Schwarz.)

Q. Can you answer the questions as to the Kaiser-Frazier car?

A. Yes. It is the same tuner as the Ford, same fundamental tuner with the same accuracy.

Q. Do any of these tuners on any of the cars, that come with any of the cars, that I have enumerated in these questions, employ A.F.C.?

A. No, they do not.

Q. You are familiar with A.F.C., are you?

A. Yes, sir.

Q. And the uses that have been made of it in the radio industry? A. Yes, I think so.

Q. And what is it for?

A. It is intended—its principal intention was to make careless tuning—to take care of careless tuning by the novice. It was brought out so you could tune approximately to the correct position and it would snap into tune. That was one of its purposes. Another of its purposes was to take care of drift—electrical drift in the [321] radio sets, because you have electrical circuits which drift with temperature and humidity, so after you set them to an accurate tuning, why, they would drift off and this was intended to compensate for that.

Q. Has A.F.C. anything to do with the accuracy of positioning of the shaft or the condenser in a tuner?

A. Well, it would make possible correct tuning when you incorrectly tuned it by any means.

Q. Are you familiar with the present situation with reference to the types of tuners that are being employed in home receivers?

(Testimony of Bertram A. Schwarz.)

A. To a considerable extent, although my knowledge is not as complete as it is in automobile receivers.

Q. There was a time, was there not, when automatic tuning was being used quite widely on home receivers? A. That is correct.

Q. And is that condition continuing today?

A. No. Since the war that has gradually decreased. Its popularity has decreased.

Q. Can you explain why?

A. Well, partly because of cost. Partly—mostly because of the complications in frequency modulation.

Q. You mean by that the modern sets are coming out with F.M. as well as A.M. receivers?

A. That is correct. [322]

Q. And has anyone been able to devise an automatic tuner that is satisfactory and accurate enough to operate with F.M. signals?

A. No, I don't believe—I don't know of any.

Q. I show you Plaintiff's Exhibit No. 3 for identification. Can you tell me what this device is?

A. Yes. I am quite familiar with this device. This is a tuner that we manufactured beginning in 1938 and in the beginning for the Buick Motor Car Division, but continuing for Chevrolet in that year in 1939 and 1940—a part of 1940 at least. It is a tuner that I think I largely devised. [323]

Q. Can you give us any idea how many of these tuners of this type Exhibit 3 were produced and put

(Testimony of Bertram A. Schwarz.)

on the General Motors automobiles during the years that you have stated?

A. I can give an order of magnitude. The exact figures are not available to me, but we made about 100,000 automobile sets for Buick each year of those three years, and this tuner was in every one of them. We made a comparable number for Chevrolet, and this tuner was in every one of them for two, at least, of those three years. That would place the total number at something like four hundred, five hundred thousand tuners, perhaps.

Q. I will ask you to look at the Zenith tuner, of which model H is an example, and state whether you understand this tuner. A. Yes, I do.

Q. Is there any feature of Plaintiff's Exhibit 3 which is similar to a distinctive feature of the Zenith tuner Exhibit H?

A. Yes, there is considerable similarity.

Q. In what respect?

A. They are both rack tuners, they both turn the tuning element 180 degrees; in our tuner we use separate racks for each station position, in this they merely use two stages of racks and gang them together with bars.

The Court: That is the Schaffer, isn't it? [324]

The Witness: That is the Schaffer tuner. We felt at liberty with our design, with what we considered some improvements, because of the existence of the Schaffer tuner, which we studied at the time and knowing it was available to us. You have just the two racks on this side and two racks on that

(Testimony of Bertram A. Schwarz.)

side, co-operating by connecting bars, whereas on our tuner we have separate racks for each station, that is, a rack here and a rack there (indicating), and then when you push each one you move the single pair of racks. And you have a single pinion going through just as you have a single pinion going through on that one, or a pinion shaft.

Q. (By Mr. Lyon): Is the tuner of the type shown in Plaintiff's Exhibit 3 similar to the Zenith tuner Exhibit H, in that there is no rocker employed? A. There is no rocker employed.

Q. What can you tell us as to whether or not the tuners, like Plaintiff's Exhibit 3 that you equipped on the General Motors cars, gave satisfactory accuracy of tuning and of condenser shaft positioning?

A. Well, first of all, our requirement for accuracy in those days was the same as the requirement for accuracy now. The sets were just as selective. We had no A.F.C. then, any more than we have A.F.C. now. And the tuning accuracy was considered very satisfactory in this tuner. [325]

The Court: I want to ask you a question in that respect.

Do you remember the Century model of the Buick?

The Witness: Yes, your Honor.

The Court: Was that radio in the Century model.

The Witness: Yes, this was in the Century model, and the Century model was during one of the years that this was used.

(Testimony of Bertram A. Schwarz.)

The Court: I am speaking now of the year 1940.

The Witness: The 1940 model of the Century, that is the year we changed from this tuner to another for some other reasons, and I would have to refer to my notes to be absolutely certain, but I am reasonably certain that it was used in that model.

May I make a statement about this tuner?

Mr. Lyon: Yes.

The Witness: I notice in trying to push this tuner, that it appears to be hard to push, and one of the reasons for that is we have an electric clutch here on the side that brings in an irreversible manual drive, and that irreversible manual drive is to allow you to tune manually. It also restrains the tuner from bumping off stations. And, of course, you would have to connect it to a battery, because that electric clutch operates every time you push the push button when in normal push button operation. Consequently, [326] when you push it now it appears to be a hard tuner.

Mr. Lyon: At this time I will offer in evidence Plaintiff's Exhibit 3.

Mr. Flam: I object to it as being irrelevant to any of the issues in this case.

The Court: Overruled.

The Clerk: Plaintiff's Exhibit 3 in evidence.

(The instrument referred to was marked Plaintiff's Exhibit 3, and was received in evidence.)

Q. (By Mr. Lyon): Mr. Schwarz, I show you

(Testimony of Bertram A. Schwarz.)

Defendant's Exhibit JJ, and Plaintiff's Exhibit No. 2 to the complaint in this case, and ask you if you are familiar with those. A. Yes, I am.

Q. Do you know who designed those tuners?

A. Well, I participated in the design of them and directed intimately a good portion of the design.

Q. Is General Motors at the present time equipping its current models with tuners like those shown by these last mentioned exhibits?

A. Some of the current models have this particular type of tuner.

Q. Can you tell us what one?

A. The Chevrolet and the Oldsmobile and the Cadillac.

Q. You recognize this tuner as of the type which has been referred to here as having an adjustable tappet and [327] a rocker? A. Yes, I do.

Q. Will you state whether or not in tuners of that type as you have designed them and General Motors has produced them, the centers of those tappets are arranged so that they are symmetrical or concentric or identical with the centers of the rocker?

A. Yes, I believe they are concentric.

Q. You understand that that has been referred to here as coaxiality where those two centers register? A. Yes.

Q. Does that feature incorporate any established principle of engineering?

Mr. Flam: If your Honor please, the question is

(Testimony of Bertram A. Schwarz.)

indefinite. I don't know whether the question means whether it incorporates any feature of engineering found in rather foreign fields or in this particular field of automatic tuning.

Mr. Lyon: I am going to ask him what and where. It is a preliminary question and I didn't want to lead him.

The Court: Coaxiality generally, do you mean in general nomenclature?

Mr. Lyon: Yes, your Honor.

The Court: Overruled.

A. I think the principle of coaxiality is understood [328] by machine designers.

Q. What principle of engineering is utilized in establishing such coaxiality?

A. The elimination of all moment arms, or making the center of rotation the same, means the center of travel, the arcuate travel is the same.

Q. To your knowledge how long has that principle been commonly known to engineers?

A. I wouldn't know how far back that would go.

Q. To your experience how far does it go with you?

A. From the time of my schooling, from the time of studying mechanical design, mechanical engineering.

Q. Will you state whether or not it is a well-known principle of engineering, this matter of eliminating moments by making things concentric or symmetrical?

A. I believe the elimination of moments mak-

(Testimony of Bertram A. Schwarz.)

ing things line up concentric, coaxial, I believe is a well-known and well-established principle of engineering.

Q. Based on your experience with the machine designers that you have had working under you during your career, in your opinion or in your experience have you found that the average or ordinary machine designer knows of that principle?

A. That would be a difficult question to answer that way, but I would expect a good many machine designers to understand the principle of moment arms and the principle [339] of putting centers on center.

Q. Are you speaking now as of only today or was the situation any different at any time back to the beginning of your experience in the radio industry?

A. During my experience in radio industry, from the beginning of that I would think that that would be a known principle of lining centers up to have them revolve in the same order in the same circle.

The Court: Wouldn't that be true generally from a mechanical standpoint, leaving out the question of electronics or electrical mechanism, wouldn't that be true generally?

The Witness: I think, your Honor, it would. I believe when you line up two things to have minimum bind you would line them up on center. When you want to put two wheels adjacent to the other you would want them on center. In this particular

(Testimony of Bertram A. Schwarz.)

case you have one as a virtual center and the other as an actual center. The virtual is either in the tappet or the rocker, and vice versa for the actual. If you want them to operate in the same space and revolve in the same circle, I would expect them to be put in the same position.

The Court: The only feature that would apply in these electrical devices would be the method of applying the energy; in one case it would be applied mechanically and in the other electrically, is that it?

The Witness: Yes, you want the mechanical device to perform an electrical function later, the electrical function being to tune the radio set.

Q. (By Mr. Lyon): As far as the tappet acting on the rocker to position the rocker to something that corresponds to a position that you desire the condenser to have, is that in any way an electrical function or entirely a mechanical function?

A. It is a mechanical function that finally transfers into an electrical one. In other words, the angularity in this particular case determines the position of the cores in the coils as I believe has been explained, determining the tuning of the radio set electrically, and, therefore, you are interested in the actual position of those cores in the coils and that is transferred here into an angular position of this rocker arm. And that is also true whether it be a condenser or an iron core.

Q. I show you Plaintiff's Exhibit No. 1 to the complaint in this case, and the corresponding more complete model Defendant's Exhibit No. NN; do

(Testimony of Bertram A. Schwarz.)
you know who designed that type of tuner?

A. I could not testify to the actual designer. It would be hearsay.

Q. Do you recognize this tuner?

A. Yes, I recognize the tuner. We adapted it to our [331] use.

Q. You obtained that design from——

A. Another source.

Q. And was that from the Radio Condenser Company? A. Radio Condenser Company.

Q. They were making a somewhat similar tuner?

A. That's right. It started out to be a gang condenser tuner and the transition was from condenser tuning into inductance tuning, permeability tuning. We took the same tuner and left off the condenser and put it in the tuning coils in place of it.

The Court: I think we will take a recess for a moment to adjust this air a little bit.

(A recess was taken.)

Q. (By Mr. Lyon): You have stated, Mr. Schwarz, that the tuner of the type shown in Exhibit 1 to the complaint and in Defendant's Exhibit NN was developed from an earlier tuner that had been designed by the Radio Condenser Company, is that right?

A. It was designed by someone else, and we believe by the Radio Condenser Company.

Q. Had you been furnished with those tuners by the Radio Condenser Company?

A. Yes, we had. We had been furnished with

(Testimony of Bertram A. Schwarz.)

that same tuner with a gang condenser attached by the Radio Condenser [332] Company.

Q. In commercial quantities?

A. In commercial quantities.

Q. Did you ever determine whether or not that tuner was patented?

A. I would have to leave that to our patent counsel. He did the investigation of the patentability.

Q. Mr. Fowler sitting here?

A. Mr. Fowler.

Q. Did you ever see this patent, that I am handing you, to Mr. J. F. Teaf, assigned to the Condenser Development Corporation, granted February 17, 1944, No. 2,273,499?

A. Yes, I recognize the patent, although the details of it are not familiar to me at the moment. At the time we went over them I was familiar with the details.

Q. Can you examine the drawings briefly of that patent and state whether or not the forerunners of the tuners, such as the type constituting Plaintiff's Exhibit No. 1 to the complaint, were similar to that shown in those drawings?

A. Figure 9, I would say, is very similar.

Mr. Lyon: The patent which has last been shown to the witness is offered in evidence as Plaintiff's Exhibit No. 4.

The Court: So ordered.

The Clerk: Plaintiff's Exhibit 4 in evidence.

(The document referred to was marked

(Testimony of Bertram A. Schwarz.)

Plaintiff's Exhibit No. 4, and was received in evidence.)

Q. (By Mr. Lyon): Will you tell us what cars of the General Motors Corporation are being equipped with tuners like these of the type shown by Exhibit 1 to the complaint and Defendant's Exhibit NN?

A. Does that embrace both the condenser tuners—the tuner part itself we are talking about?

Q. As I understand it, this type of tuner is made for use both with condenser type tuners and permeability type tuners? A. That is quite correct.

Q. You answer the question covering both, if you will?

A. We are supplying the condenser type—we are using the condenser type which we purchase from Radio Condenser Company, and we are using that in the Pontiac set. We are manufacturing the iron core tuner type, and we are using that in the Buick and the current Chevrolet set.

Q. What is the principal difference between this type of tuner, so far as the tuner itself is concerned, that is shown by Exhibit 1 to the complaint, as compared with the type of tuner that is shown by Exhibit 2 to the complaint?

A. To be perfectly certain I would like to see Exhibit 2 [334]

Q. Exhibit 2 to the complaint is also illustrated by Defendant's Exhibit JJ.

A. Exhibit 1, the plungers, do not pass through the center of the treadle bar, the tappet has a vir-

(Testimony of Bertram A. Schwarz.)

tual center, it has a screw type lock-up, which, of course, is not the subject of this specification. Exhibit 2 has the plunger going through the center of the rocker. I called it the treadle bar, I believe. It passes through the center of the rocker, and has the tappet unlocked and locked by what we call a push-pull lock-up device, the device that unlocks by pulling the button out, and locks by pushing it in, as compared to a screw type lock-up on this plunger of Exhibit 1.

The Court: Actuate that one, please.

The Witness: Yes.

(Witness demonstrating.)

The Witness: Then to unlock it, we lift the button and unlock this set screw here instead of pulling out the unlocking mechanism. And to lock it we rotate it in the opposite direction and push it in this way. (Indicating).

Q. (By Mr. Lyon): Mr. Leishman has called attention to the buttons, or whatever you call them, that appear on the tuners such as shown by Exhibit NN, and Exhibit 1 to the complaint; what are those buttons for?

A. It is an ornamental feature that Chevrolet wanted something different. They wanted not to have to pull a button [335] off to set up the station, so that we hinged the buttons to make it easier to get at the lock-up screws. You pull the button up so you can get to the screw, and then the lock-up screw then becomes available. If you didn't do that, you would have to pull the button off.

(Testimony of Bertram A. Schwarz.)

Q. Is that tappet in that type of tuner carried by that button?

A. No; the tappet is carried by the plunger.

Q. You have stated in connection with the tuner of the type constituting Exhibit 1 to the complaint, that it has a virtual center. Does the tappet have a pivot which is coaxial with the axis of the rocker?

A. The tappet's pivot is coaxial with the axis of the rocker.

Q. Is it the pivot of the tappet or the phantom—

A. It is the phantom pivot.

Q. You mean by a phantom pivot what, so the court will understand?

A. To illustrate: I may not be able to put it in words too well, but to illustrate it, in this particular type of tappet it is pivoted there with a rivet, and that rotates—maybe I can demonstrate that by pushing this in and rotating it. See, it rotates about that rivet in the center.

The Court: Why do you call it a phantom?

The Witness: It is a phantom because the support is really a seat around the outside of the tappet, and the phantom position of rotation, the center of rotation, therefore, is phantom or virtual in here somewhere (indicating). In other words, the cam is held on the outside like a half moon or crescent, and rotates around a seat, and here is your center of rotation (indicating), but that is a phantom, there is no actual rivet or bearing point there.

Q. (By Mr. Lyon): In other words, in the Exhibit 1 to the complaint type the tappet does not

(Testimony of Bertram A. Schwarz.)

have an actual pivot which is physically coaxial with the axis of the rocker?

A. It does not have an acutal pivot physically coaxial.

Q. But the center of rotation of the tappet is around a point which is not defined by any mechanism, and that point is coaxial with the axis of the rocker, is that correct?

A. I think that is a good description of it. That is correct.

Q. A point in space, I might say, your Honor. Is that correct?

A. That is correct, a point in space.

The Court: Is that what you mean by a phantom?

The Witness: Yes, the phantom is the point in space.

Q. (By Mr. Lyon): Can you tell us what difference it would make or what if any difference in the operation of either of these type of tuners, Exhibits 1 or 2 to the complaint, if these centers we have been talking about were not coaxial?

A. Coaxiality is a good design feature, but not one of major importance. We feel that there are many other items of the tuner design that might swamp out the improvement which might be gained by the coaxiality. For example, the fit of the bearings, or a burr on the tappet, or a bent tappet [338] would overcome any good that might be gotten from coaxiality. In other words, coaxiality is a good feature, but it is not the only feature which must be

(Testimony of Bertram A. Schwarz.)

considered in the design of a tuner to be accurate enough.

Mr. Flam: If your Honor please, I move to strike that answer because it seems to me an attack upon the utility of the device used which incorporates the important feature of the patent. Any attempt to minimize the accomplishment being accomplished by the patent—there is an effect of estoppel against.

In United States Gypsum Company versus Consolidated Expanded Metal Companies, 130 Fed. (2d) 888, it says:

“It has been held in adjudication without number, that one who appropriates the teachings of a patent may not deny the utility of the invention. This is, of course, both reasonable and logical.”

They use the coaxial arrangement and they try to minimize it by saying it is not of much use.

Mr. Lyon: If your Honor please, I don't think the witness is denying the utility of the design; he is trying to give your Honor his opinion as to the importance of the feature. It has been played up here as being all important in automatic tuning in the defendant's testimony. The witness is not denying its utility, but is trying to inform your Honor of how much importance it really has. [339]

It has been suggested to your Honor that this matter of putting two centers together in this device should be held to be a generic invention. And it could be much less than that and still have utility.

I think we are entitled to the witness' experience

(Testimony of Bertram A. Schwarz.)

as to just what importance it has in the tuner, as a matter of fact.

The Court: I think so. I don't think the principle of the Gypsum case there is necessarily applicable at this point of the case at bar.

I gather from the defendant's testimony and from the argument that has been presented here that he claims to have what I call a generic patent. I am not using those terms because it is a play on words. That is not what the court means. What I mean is a generic patent in the sense of the case of Eibel Process Company versus Minnesota & Ontario Paper Company (261 U. S. 45), and I don't think the principle applied there has been improved on, notwithstanding the multitude of decisions that we have had since.

There must be a starting point, and then if during the progress of the art there are improvements, the degree of improvement is necessarily an issue in these patent cases.

As I understand the defendant in this case, he claims to be the pioneer in this field, and that all of these other inventions or patents, whichever term you want to use, are [340] simply the result of the teachings which he first conceived and put into his patent.

Mr. Flam: Your Honor, that matter of claiming to be a pioneer, of course he is not claiming to be the first one to make and devise an automatic tuner. Let's see the situation here. He obtains the patent, a rather narrow one, I am quite sure, but limited

(Testimony of Bertram A. Schwarz.)

to this coaxial arrangement between the rocker and the tappet. That is a rather narrow scope. All the plaintiff has to do, General Motors Corporation, is to separate those two axes. If it is just as good, why do they insist upon taking that very feature, and then kick it around and say, "Well, it isn't much good anyway, we use it because it is just a good principle of design."

The Court: I think that argument you have just made would justify the evidence. I am not saying which side of it the court is going to take. I will say that when the case is decided. The motion to strike is denied.

Q. (By Mr. Lyon): Mr. Schwarz, if it isn't essential to the operativeness of these tuners that these centers be coaxial, why do you make them coaxial in your tuners?

A. Because I believe it is good engineering to make them coaxial.

Q. I wish you would explain to the court how these tuners are operated and constructed with reference to the load that is put on the shaft that will influence whether the shaft would be apt to be moved in any undesirable manner if [341] the centers were not exactly coaxial? I have in mind the demonstration that was made by the defendant with Exhibit M where the shaft is practically entirely friction-free to float. I don't know as his Honor has felt that shaft. There is no load on that shaft, your Honor, and the slightest pressure will turn it.

A. It is necessary to restrain the rocker, or to

(Testimony of Bertram A. Schwarz.)

have more friction in the rocker than the friction in the tappet to move the tappet, because if the friction in the tappet was greater than the friction in the rocker, the rocker then would move away from the tappet instead of the tappet taking the correct position of the rocker. So that a frictional relationship is quite important.

Q. How is that brought about in the tuners of Exhibit 1 and Exhibit 2 to the complaint?

A. The load of the tuner constitutes some of the friction which we have initially on the rocker. The load in this instance in Exhibit 1 consists of the pointer mechanism of the cores which tune the radio set electrically and the manually tuning gearing means which in this instance is not de-coupled during tuning. That spinning the manual around, this being the manual, the gear here, and the shaft, spinning the manual around constitutes quite a frictional load on the rocker. Therefore, when we open up the tappet to set it it can be expected that the tappet [342] friction would be less than the rocker friction.

Q. You are referring in your last answer to Plaintiff's Exhibit No. 1 to the complaint?

A. Yes.

Q. You may continue. I just wanted the record to identify that.

A. If, then, there was a bind or a burr or a bend in the tappet, of course the added friction of the tappet would cause the rocker to move to a new position, and in that case it would be necessary to re-

(Testimony of Bertram A. Schwarz.)

strain it manually while setting up the push button. I am not sure if I answered the complete question.

Q. If you have anything further with reference to Exhibit 2 type of tuner, I wish you would state as to that type.

A. Exhibit 2 tuner, unfortunately, doesn't have the manual gearing means connected to it. In this case we use a worm drive for coupling the tuner shaft to the manual tuning means, and a worm drive is irreversible. Of course, it would mean that the tuner shaft would never be moved. Therefore, in the normal process of tuning the first motion of the plunger is to de-couple by a clutch gear the irreversible worm from the tuner shaft and allow you to tune the tuner shaft to the desired push button tuning position. If, however, we are going to set up the push [343] button on the station, we have as a feature of this tuner that when the setting of the tappet is unlocked the clutch does not operate, and the worm, irreversible worm connection to the tuner shaft, remains connected and restrains the rocker from moving to any other position than that to which it was set, and to which we want to set our plunger. In that way our frictional relationship between the tappet and the rocker is minimized. We are not as critically concerned about that relationship as we would be if we had a device which could freely rotate when we were trying to set up the tappet to a new position.

Q. Did you observe the demonstration that was made by the defendant with Exhibit E today, which

(Testimony of Bertram A. Schwarz.)

he said demonstrated the absence of coaxiality, and he set the tappet, then brought it down and showed that it would move the treadle bar or rocker?

A. Yes, I think I paid attention to that demonstration.

Q. In view of what you have had to say about the load that is put on the rocker in the General Motors tuners that we have before you, Exhibit 1 and Exhibit 2 type to the complaint, does that demonstration apply to the General Motors tuners?

A. Yes, but as I tried to make clear, in the type of the worm gear, particularly, the importance of it is [344] lessened because of the restraint on the one, and it is lessened—it is confined by whatever clearances we have in the arm. In other words, if it can't jump very far it isn't very important.

Q. In your opinion, based on your experience with these tuners and your engineering designing, would the amount of that possible movement of the rocker, in view of the load on the rocker in your tuners, be of any serious significance, if the centers were not coaxial?

A. The degree is hard to testify to. I would think that it would not be as serious as if you didn't take other means to minimize it.

Q. I show you a model which I used in my opening statement, and I will ask you if you ever saw that model before?

A. Yes, this is the model we had our engineering model shop make under my direction. I assigned the project to one of our mechanical engi-

(Testimony of Bertram A. Schwarz.)

neers and one of our model makers and asked him to make it.

Mr. Flam: If your Honor please, if this model is going to be used, I want to register an objection to it. If it is supposed to be built in accordance with the patent, your Honor will note that it is almost impossible, without the use of a great deal of force, to move these rockers and tappets, to move the two rockers. Apparently there is some [345] kind of a drag somewhere in these shafts. Whether they are coaxial or not, I don't know. But your Honor can see if he tries it.

The Court: I won't try it until it is in evidence. I want to know what it is.

Mr. Flam: It purports to be a reproduction of what is shown in the patent in suit.

The Court: You mean that it purports to show that the mechanism that is delineated in the drawings of the patent in suit and illustrated by the description will not work, it is so rigid that it will not work, is that what you mean?

Mr. Flam: This apparatus is not in accordance with the description in the application for that reason. The rockers and the condensers are so arranged that a considerable amount of force must be exerted upon those rockers to adjust the position of the condensers there.

The Court: Well, it can be used for the purpose of illustration, anyhow.

Mr. Lyon: I am first trying to have the witness identify the model as a physical representation of

(Testimony of Bertram A. Schwarz.)

the drawing of the re-issue patent in suit, so that your Honor can compare that physical entity with the accused devices.

The Court: We will have it marked for identification, and then you can go ahead with your examination, and we may [346] have to defer the admission of it, if it is offered in evidence, until such time as they can cross-examine on that aspect of the situation.

The Clerk: Plaintiff's Exhibit 5, for identification.

(The instrument referred to was marked as Plaintiff's Exhibit No. 5, for identification.)

Q. (By Mr. Lyon): In the production of this Plaintiff's Exhibit 5, for identification, was the device shaped, particularly, in exact accord with the drawing of the reissue patent in suit, Defendant's Exhibit A?

A. The tuner was copied from the drawings, and we attempted to scale the drawing in the absence of any other specifications.

Q. You have added to the drawings shown in Exhibit A certain condensers, have you not?

A. That is correct.

Q. Are those condensers indicated in the patent?

A. Yes, there is one section of the patent that says it can be geared to, or, in other words, coupled to through cords, belts, shafts, or universal joints, chains, gears, or even flexible shafts.

Q. Dismissing for the moment the condensers and coming just to the parts that are shown in the

(Testimony of Bertram A. Schwarz.)

drawings of the re-issue patent in suit, is it your testimony that you have checked this model and that it is exactly in accord [347] with those drawings?

A. The tuner portion is exactly in accordance with those drawings as nearly as we can scale them and make them by a competent model maker.

Q. There has been some criticism suggested here of the operativeness of this model because too much force, it is said, is required to move the inner rocker. Can you tell us why it is so difficult to move that inner rocker?

A. I think that might be a question of alignment and the type of gearing needed. The specification does not call for anything in here (indicating), and since we have a bearing here and a bearing here, and then we go through a fairly rigid joint here, and a bearing here, and a bearing on this side, we have too many bearings, perhaps, to line up. It might be that a universal joint might assist that a trifle. But, of course, the specification does not call for anything of that sort. [348]

Q. Does the specification of the reissue patent tell you how much force should be required to move the inner rocker? A. Yes.

Q. Does it tell you what type of condenser should be used? A. No.

Q. Is this condenser in the model, Plaintiff's Exhibit 5, is it connected to the inner rocker, a fixed condenser?

Mr. Flam: I didn't understand you.

(Testimony of Bertram A. Schwarz.)

Q. (By Mr. Lyon): Is that a fixed condenser?

A. That is a variable condenser, and it is a standard current model, or recently current.

Q. Does that require any greater or less force to move or turn the condenser leaves than the condensers that were in use on tuners in 1934 to '37, to your knowledge?

A. When the model was built it was a standard tuner, and it might have been a little less. It wouldn't have been any more than the condensers that were available in those earlier years.

Q. In other words, this reissue patent is entirely silent. About how much force is required to turn this rocker, entirely silent about just what type of condenser is to be used with it, but this model as you have made it employs actually a condenser of a standard type as of those years, [349] isn't that correct, so far as the force required to turn it?

A. When the model was built the force required to turn the gang condenser, and I believe it still exhibits about that same force. Without having measurement means before me, I would say that is correct, that it is about the same order of magnitude as the condensers available at that time.

Mr. Flam: Your Honor, I move to strike that answer, because I don't think the witness is competent. I don't see how he can remember exactly how to compare the force required to turn this with what was required about 10, 15 years ago.

Q. (By Mr. Lyon): Can you tell us how you

(Testimony of Bertram A. Schwarz.)

can remember that, if there is anything extraordinary about being able to remember that? Were you working with those condensers then?

A. Yes, we were. And I know the specifications then and now, but of course I have no instruments before me right now. The specifications on gang condensers that we asked for was a rotating turning force about three inch ounces. That number of years ago I think we had to take condensers up to five inch ounces, and there are times when we still can't buy them at three inch ounces. Whether this particular condenser is three inch ounces, I am not prepared to say [350] without measurement.

The Court: That would be a matter of precision measurement?

The Witness: Yes, precision measurement with instruments.

Q. (By Mr. Lyon): Have you determined approximately how many degrees of movement are possible with the inner rocker in a device constructed like this model, Plaintiff's Exhibit 5, where there is also the outer rocker and the double tappet to operate both rockers?

A. I am sorry, I haven't those figures available. I know it was a very limited angular rotation.

Q. Can you illustrate to the court, even though you don't have the actual measurement, what the limiting factor is?

A. Let me see if I can.

I am afraid I will have to do a little studying of

(Testimony of Bertram A. Schwarz.)

it before I can make a very effective demonstration. I would take too much of the court's time.

Q. But you know it is a very limited amount?

A. Yes, and it is due to the fact that one is within the other, and when set from one extreme of one to the other, one cuts into the other's rotation. I would have to work this one to demonstrate it. I am not very dextrous at the moment. [351]

Q. Do you consider this model, Exhibit 5, as thoroughly illustrating in its tuner mechanism the structure shown in the drawings of the reissue patent, Defendant's Exhibit A? And in its application to the condensers a thorough application of those condensers to that type of tuner?

Mr. Flam: Your Honor, that calls for a conclusion. I object to it. He testified how it was made, and I think it is within the province of the court to decide whether it is a fair embodiment of the structure, or not.

The Court: I think so. Objection sustained.

Mr. Lyon: I will offer Plaintiff's Exhibit 5 in evidence, your Honor, as illustrating in the mechanical parts corresponding to the drawings of the patent in suit a model illustrating those structures, and insofar as the embodiment with the condensers is concerned, merely an attempt to illustrate how they could be combined and would be combined with condensers, but with no attempt at precision, because the patent in suit doesn't give any details as to that arrangement.

(Testimony of Bertram A. Schwarz.)

Mr. Flam: If your Honor please, the witness himself stated that there might be some binding in the shafts, and pointed out other things that make it deviate from what is shown in the patent. I, therefore, renew my objection to the introduction of this model in evidence. [352]

The Court: I think so. There ought to be some further evidence as to the functioning of the model before it is admissible.

Mr. Lyon: Let me have the model, Mr. Clerk.

The Court: You had better leave it here; it is marked for identification.

Mr. Lyon: I just wanted to ask the witness.

Q. (By Mr. Lyon): Mr. Witness, are you prepared to demonstrate the operation of this model, to illustrate the operation called for by the specifications of the reissue patent in suit, or would you rather take this model and see if you can loosen it up some?

A. I would much rather do that, because it has been many months since I have seen it.

Mr. Lyon: If I may, I will withhold the question.

The Court: Yes. Then if you will be able to tell us what you did to get it in shape. I don't suppose there is any objection to that, is there, Mr. Flam?

Mr. Flam: No.

The Court: He will be permitted to take it tonight if he wants to take it at the recess. Of course if you disassemble anything, Mr. Schwarz, you bring those disassembled parts with it.

(Testimony of Bertram A. Schwarz.)

The Witness: Yes. I am only going to try to line it up a little more accurately, and go through the motions of [353] turning the thing. It hasn't been actuated for many months.

Q. Prior to 1937, Mr. Schwarz, what usage was there of push button or dial tuning in the radio industry, to your knowledge?

A. Of course there was the Zenith cash register tuner, which is introduced in evidence here, in 1927 and '28. Then there was a motor tuner that I am familiar with that was used by Wurlitzer in 1929, approximately. And there was a telephone dial that was used by R.C.A. in custom built installations, which you could dial your stations, in perhaps 1932 or '33. And then there was the simpler types of telephone dials represented by some of the patents discussed here. I think Fitzgerald is one of them; Briggs and Stratton had demonstrated a few of those; there was the Grigsby-Grunow; Philco; and I am not entirely sure, but I think Stewart Warner made one of those.

Q. Were these various push button or dial tuners that you have named sufficiently accurate for operative purposes for tuning radios?

A. I think some of them were. I think I was shown a demonstration of one, without automatic frequency control, and it did a very creditable job of tuning in a household receiver of about the selectivity of today.

Q. What tuner was that?

(Testimony of Bertram A. Schwarz.)

A. A tuner demonstrated to us by the Briggs and Stratton [354] Manufacturing Company.

Q. When? A. In about 1936.

Q. Were the others satisfactory in performance when combined with A.F.C.?

A. Yes, they were quite satisfactory. That type of tuning, as far as accuracy was concerned, the Philco and the Grigsby-Grunow, I believe, tuned in the station quite accurately.

Mr. Flam: For the record, do you mean by A.F.C., automatic frequency control?

The Witness: Yes.

Mr. Flam: It is the same thing that Mr. Leishman was testifying about yesterday, is that right?

The Witness: Yes. Then, in addition to that tuner, I almost neglected a tuner shown to us by General Instrument in 1936, the latter part of 1936, which was a screw and nut similar to the Marvin teaching, and using a rocker, and it didn't have coaxiality, and we put one of those in a radio set and tried it out for its possible use in an automobile, and we were satisfied accuracy-wise with that device.

Q. (By Mr. Lyon): Referring to house radios, home radios, beginning about 1937 and referring to tuners of the adjustable tappet type, were there any such tuners in use without employing A.F.C.? [355]

A. Yes, there were.

Q. What ones?

A. Adjustable tappet types without A.F.C., let me think. I couldn't state with positiveness. I be-

(Testimony of Bertram A. Schwarz.)

lieve Emerson, but I couldn't state with positiveness.

Q. When we refer to a tuner of the adjustable tappet and rocker type, you are referring to a mechanical tuner, are you not?

A. Yes, we are.

Q. When and by whom were tuners produced of the electric type? [356]

A. The electric type? Crowe Name-Plate made some. Who used them in radio sets I am not familiar with, but they sold some. We made them, that is, Delco radio division for the United Motors Service, early in 1937 or '38. Motorola made one in 1938 and continued it for several years, I am not clear how many.

Q. Those motor or electric tuners differed from mechanical tuners in what general way? Can you make a simple statement of that to the court?

A. They are a multiplicity of some types. The type I am most familiar with, the type we used was a multiplicity of cams on a common tuner shaft that was set to different angular positions, and an electric relay came down on the surface of that cam, and the cam had a high side and a low side, if it fell on the high side the motor would turn in one direction, if it fell on the low side it would turn in another direction until it hit a notch; when it hit a notch the pawl would fall in the notch and turn the motor off, and that would be the in-tune point. You would set the angular position of those notches or cams on the shaft to determine the particular

(Testimony of Bertram A. Schwarz.)

stations for each setting. That was one of the types.

Q. Were those motor or electric tuners used on automobiles at all?

A. That was used on the United Motors automobile set [357] which was put on a great variety of automobiles.

Q. Did you usually hear sort of a hum or noise when it was moving from one station to the other?

A. We had a mute switch on ours which would cut out the speaker during the tune-in process so that you had no electrical noises through the radio until it came in tune.

While we are speaking about electric tuning, there was another type that I have neglected, and that is the one similar to the one that I mentioned before was used by Wurlitzer back in about 1929, then later it was used by Detrola of Detroit, Michigan, in their household sets, and it is what we commonly refer to as a dead spot commutator. That consists of a disc turned by a motor, having one dead position and having two arcs of copper bars. When the finger of the station that you actuate comes in contact with one arc the motor will turn in one direction; if the finger happens to be on the other side of the disc so that the other arc is contacting the finger, the motor turns in the other direction, and when the motor hits the segment between the two copper sections of the commutator it stops, and that is the in-tune position.

Q. As I understand you, these electric or motor-

(Testimony of Bertram A. Schwarz.)

driven tuners were in very wide use in the industry, is that correct?

A. There were quite a few of them. [358]

Q. I don't mean the number of different ones, but I mean the total, they were widely used in the industry?

A. There were quite a number of them made. Motorola made a great quantity of them, the exact quantity, of course, I don't know. We made—I wouldn't have the figures, I would guess that our figures might be around ten, fifteen thousand on the one we made for United Motors, and then of course the others of Wurlitzer, and so on.

Q. Over what period of time were these motor-driven type of tuners being made and sold?

A. Detrola appeared about 1936 or early 1937 and it continued for at least a year, maybe two years, and after that I lost track of it. The Motorola continued from, it was either 1937 or 1938, and continued for a number of years. Whether it continued into 1941, or it was 1940, I am not sure. [359]

Q. What about your own?

A. Our own lasted one year. The reason for it was it was quite expensive and we superseded it with some other tuners.

Q. Were these motor-driven electric tuners accurate so far as tuning was concerned?

A. Yes. The tuner I am most familiar with, our tuner, was quite accurate.

Q. Did these motor-driven or electric tuners

(Testimony of Bertram A. Schwarz.)

have this feature of coaxiality that has been discussed in this case?

A. No, there was no similarity in mechanism at all, no coaxiality involved there of the type we are talking about.

Q. What type of mechanical device, as distinguished from the motor type, was first used in automobile radios?

A. I don't know the first one, but I do know one of the first, and that was the one introduced in evidence here, which we talked about, used in the Buick and later in the Chevrolet in great quantities. If it wasn't the first, it was very close to being one of the first.

Q. What next do you know of the use for that purpose of the mechanical type?

A. The next most popular, and one that perhaps superseded that, was the type around the Marvin construction [360] of an advancing nut with a screw and a rocker.

Q. When did that type come out, Mr. Schwarz?

A. We first introduced it to supersede the electric tuner at United Motors in about 1938.

Q. Did that type employ coaxiality?

A. No, it didn't employ coaxiality.

Q. During what years was your concern producing that Marvin type?

A. I would like to make one correction in the record. I said during 1938. I believe actually it was a little after the first of 1939 that we introduced it. It was in the spring of 1939, I believe.

(Testimony of Bertram A. Schwarz.)

Q. How long did you continue?

A. We continued it until this year.

Q. To what extent?

A. We used that in many hundreds of thousands. We used it first in United Motors before the war, and until the war; we used it on the Oldsmobile, and we used it on the Cadillac; we used it for a while on the Chevrolet. After the war we continued it on the Oldsmobile and the Cadillac until the 1948 models.

Q. You have referred to that as the Marvin type of tuner. I show you a patent to H. M. Marvin, No. 1,707,754. Is that type of tuner described in that patent or illustrated in the drawings of that patent? [361]

A. It has one feature, and I kept calling it, maybe inaccurately, the Marvin tuner.

The Court: Is that the one in the Book of Patents?

Mr. Leishman: It is the one.

The Court: 1,707,754?

The Witness: That is the one. In referring to the Marvin, I was considering the method of adjusting the tappet. The other difference from the Marvin was that we used a single bar rocker as differentiated from a double bar rocker which we have been talking about here. I don't mean two double bar rockers which I would call this. (Indicating.)

Q. (By Mr. Lyon): By "this" you mean Exhibit 5?

(Testimony of Bertram A. Schwarz.)

A. Yes. This being a double bar, and here is another double bar. Ours had only a single bar. To take the place of the other bar we had the spring loaded against the nut, so it is a spring loader tuner.

Q. Therefore you didn't have a rocker in that type of tuner with spaced arms on opposite sides of an axis?

A. No. We had a single arm on one side of the axis, and it is spring loaded up against the interference, the interference being the tappet, and the tappet being an advancing nut, so that there was no question of coaxiality there.

Q. You say that that was your standard production from [362] 1939 to 1947 on your factory equipped cars?

A. Not all factory equipped cars. It was standard production on our Chevrolet for a while, United Motors until the war, on our Oldsmobile and our Cadillac until this year.

Q. What can you say as to the degree of accuracy of that device?

A. It was very satisfactory. I had one on my car for many years during the war and didn't have to reset the buttons for a period of a year at a time.

Q. Do the tuners of the type of exhibits 1 and 2 to the complaint here have any greater accuracy than those Marvin type of devices?

A. That is hard to say, because I believe the degree depends upon the finesse with which all details

(Testimony of Bertram A. Schwarz.)

are watched in both cases. But I would think that it is of exactly the same order of magnitude, exactly the same order of accuracy, with the same care in production.

The Court: I think we will suspend, gentlemen.

We will have to have a session in this case on Saturday, gentlemen, unless we finish tomorrow. I was wondering whether we would make any time by convening earlier tomorrow morning than ordinarily?

Mr. Lyon: I think we are going to be able to get through tomorrow. I have very little more with Mr. Schwarz, and I think my other witness is going to be very short on a [363] different patent.

The Court: How do you feel about it?

Mr. Flam: I will do my best. I hope we can finish. I think if Mr. Lyon gets through not too late in the afternoon we should be able to finish.

Mr. Lyon: I think I will be through tomorrow morning.

The Court: 10:00 o'clock tomorrow morning, gentlemen.

(Whereupon, at 4:35 o'clock p.m., an adjournment was taken until 10:00 o'clock a.m., Friday, May 28, 1948.)

Wednesday, June 2, 1948, 10:00 A.M.

The Court: Ex parte matters?

(No response.)

The Court: Call the case.

The Clerk: 5781-M, General Motors Corporation v. LeRoy J. Leishman, further trial.

Mr. Lyon: Mr. Schwarz, will you resume the stand?

BERTRAM A. SCHWARZ

called as a witness by and on behalf of the plaintiff, having been previously sworn, resumed the stand and testified further as follows:

Direct Examination

(Continued)

By Mr. Lyon:

Q. Have you read the transcript of the testimony you gave at the prior hearing of this case on May 27th A. I have.

Q. Do you want to make any corrections in that testimony as transcribed?

A. On page 319, line 2, the question was: "Now, with reference to the current models of the Chrysler Corporation, including Plymouth, Dodge, DeSoto and Chrysler, do you know what type of tuners are supplied by the manufacturers of those cars with their current models?" and I answered that I did, [371] "Yes, I do"; the question then referred to: "Is it a type that has an adjustable tappet and rocker?" and I answered "No"; and the next question was: "What type is it?" and I answered, "It is a switch type."

With reference to that, I had in mind the radio supplied to the Chrysler line of cars by Philco, who

(Testimony of Bertram A. Schwarz.)

were at one time the sole source, and are continuing as a source, as far as I know, and their tuners have always been and are of the switch type. However, there is another manufacturer, the Colonial Radio, who supply a model to Chrysler, and I am not familiar with the intimate details of the tuner they use.

There is another on page 349, line 4. The question was: "Does the specification of the reissue patent tell you how much force should be required to move the inner rocker?" and the answer recorded here is that I said, "Yes," and it should have been "No."

Q. Just before the adjournment of the hearing in this case on May 27th, you were requested or directed to take the model, Exhibit 5, for identification, and loosen it up. Will you tell the court whether you have done so, and just what you have done with the model since the last hearing in this case, and I will put the model in front of you so that you can demonstrate to the court if you so desire.

The Court: You may put it up here, Mr. Schwarz.

A. I oiled the bearings of the tuner, not of the gang [372] condenser, and then the collar attached to one of the driving gears was loose, and I couldn't remove or tighten the set screw because the head was broken, so a pin was driven into—through the collar into the shaft to tighten it onto the shaft.

(Testimony of Bertram A. Schwarz.)

No parts were removed from the tuner. I then took the condensers and disengaged them from the tuner and made up a torque bar which I have here, and measured the torque of the condensers to see if they were within reason of commercial tolerances, and found with this torque bar attached to this condenser, and this condenser (indicating), when they were disengaged, that this one measured under 3 inch ounces (indicating) and this one measured about 3 inch ounces (indicating), and I had testified that our Delco radio production limit was 3 inch ounces on condensers today used with tuners, and I have since verified that and have since found that we have frequently had to accept condensers considerably in excess of 3 inch ounces, because we are also concerned with the minimum torque on a condenser. By that I mean if these plates are too loose on the shaft and the bearings, then it microphones, we call it, and that is an interaction between the loud speaker sound wave and these plates, causing them to vibrate at the frequency of the sound wave put out by the speaker, producing a howl, and that is a very serious trouble in radios, having nothing to do with tuners.

The next thing we are concerned with is with too light a [373] load on the condensers, that they will shift alignment with temperature or with shock or vibration. Consequently, we are worried about the low limit, and the manufacturers tell us with those low limits they have to have a certain high

(Testimony of Bertram A. Schwarz.)

limit, which is three inch ounces today, and they frequently exceed that. Ten years ago condensers were only available with torque limits of about $4\frac{1}{2}$ inch ounces.

I referred to drawings to refresh my mind on that.

Then after measuring these condensers I engaged them again into the gears, and lined them up reasonably well, and measured with a torque bar the increased torque on the condensers, due to the alignment and due to the load of the tuner itself, and that amounted to about one-half inch ounce, making a total for this one something a little over $3\frac{1}{2}$ and this one a little under $3\frac{1}{2}$ inch ounces when aligned (indicating).

Q. Will you state whether or not in your opinion Exhibit 5, for identification, in the condition in which it is now presented is a fair illustration of a device built precisely in accordance with the drawings and the disclosures of the reissue patent in suit?

Mr. Flam: I object to that, your Honor, as calling for a conclusion. Your Honor is to determine that.

The Court: That is true, but I don't suppose the inquiry will end with the answer. If it does, it wouldn't give any [374] value. Overruled.

A. I believe it is. We have taken great care, as I have testified, to follow the drawings and the specifications of the patent, and we had a com-

(Testimony of Bertram A. Schwarz.)

petent mechanical engineer supervise the details under my direction, and, for example, we used commercially available gang condensers, we attached them to the tuner shaft by a common means, which is the anti-backlash gears, and in this particular instance we put a scale on here for identification—to determine the relative position of the condenser in each case, and we used what I would call a no-load pointer. In a normal radio set you would need a pointer with a considerably greater load than this one to be satisfactory for commercial use. Most of our automobile radios have a considerable load due to each pointer, and this one does not represent that. Also, this one does not have a manual tuning means, and a manual tuning means will increase the load on the condenser. So, if anything, we are giving this model a considerable advantage over what it would be if commercially used.

I then analyzed some of the reasons for the trouble occurring in this tuner, and these are my observations——

Q. Will you now demonstrate the operation of this model in accordance with the disclosures as you understand them of the patent in suit and state the results of your [375] demonstration?

Mr. Flam: May I see that for a moment? I didn't see it since it was brought back this morning.

(The exhibit was handed to Mr. Flam.)

The Witness: I would like to have the question repeated.

(Testimony of Bertram A. Schwarz.)

(The question referred to was read by the reporter as follows: "Will you now demonstrate the operation of this model in accordance with the disclosures as you understand them of the patent in suit and state the results of your demonstration?")

The Witness: I loosened the thumb-screw on the end of the lever and depressed the lever, bringing the two tappets in contact with the two rockers, and I rotated the tuners to set them to the position desired for the setting of the two tappets. And, let us say, we rotate the one to the position 50 and rotate the other to the position 50, and then we lock up the thumb-screw and release the lever and turn the condensers to other positions and see if our mechanism will now restore the condensers to the position we set them up at (demonstrating). This one has hardly moved, the position is 20 on the right-hand condenser, which might be used for television; and on the left-hand condenser it is 48, which might be used for radio. And these scale figures must be multiplied by 1.8 to bring them to degrees, since it reads from zero to 100, and there is 180 degrees of movement. [376]

The fault here was the lock slipped, the lock was inadequate for the load we have on this tuner, despite the fact that the load does not include manual tuning means, that is, a spinning manual and a brake removal, or a clutch on a manual, nor does it include higher force pointer mechanisms, commonly

(Testimony of Bertram A. Schwarz.)

used in auto radios and in some household radios. Some of the trouble we analyze is due to the multiplication needed in this particular tuner, for I find on measurement that the outer rocker has a total movement of about 25 degrees, and the inner rocker a total movement of about 38 degrees, and the limitation with the gang condensers removed is that the arm here strikes the rocker on the outer one, and the projection of the arm into the inside of the inner rocker strikes the rocker on its limit of movement, and these require a considerable amount of multiplication, in the one case about 7.1 times to move 180 degree gang, in the other case about 4.7 times to move 180 degree gang. And ten years ago gangs other than 180 degrees were very scarce, if at all obtainable. Today the common condenser available without being built into a tuner is 180 degree gang. That high multiplication adds considerably to the force or the work of the tuner. We have found from practical models that tuners which would not tune over an arc of 60 degrees—it wasn't an exact go no-go position, but below 60 degrees or very much below 60 degrees the force required on the tuner [377] was increased quite rapidly, and above 80 degrees the force was increased quite rapidly due to the attack angle of a tappet on the rocker, and due to the friction to the rocker on the tappet. So that we would place the optimum for this type of rocker tuner at somewhere between 60 and 80 degrees. Tuners of this

(Testimony of Bertram A. Schwarz.)

sort which must drive 180-degree gangs, requiring this much multiplication and only 25 or 38 degrees, would not be near optimum in efficiency.

We found that push-button tuners are acceptable to the public if they do not have a push-button force much in excess of $4\frac{1}{2}$ or 5 pounds. And when they are beyond that we get complaints from the field. And that is with a push-button stroke of $\frac{5}{8}$ or $\frac{3}{4}$ of an inch. Any more stroke than that on the tuner is generally not considered as satisfactory as tuners with shorter strokes, because the objective here is to make it like an electric bell button with the minimum amount of work to be done. And I would say that this model, therefore, due to its high step-up and due to its slipping, lock-up, with the particular design of lock-up that we have here, and with this type of mechanism and this type of load, is not commercially satisfactory.

Q. Mr. Schwarz, I am going to ask you to take this individual lever assembly, which corresponds to the assembly on Exhibit 5, for identification, and which individual assembly I will ask be marked Plaintiff's Exhibit 5(1) for [378] identification.

The Court: 5-A. What will it be, Mr. Clerk, 5-A or 5(1)?

The Clerk: 5-A, for identification.

(The instrument referred to was marked Plaintiff's Exhibit 5-A, for identification.)

Q. (By Mr. Lyon): Explain this lever assembly to the court and explain the locking mecha-

(Testimony of Bertram A. Schwarz.)

nism, the type of lock embodied in that assembly, and explain to the court whether or not that type of lock and the presence of the second lever and the thumb screw, and so forth, is dictated by the fact that it is a lever type device rather than a push-button type device?

A. I will again endeavor to do so.

We have the two tappets here positioned on a shaft held by two nuts, and, incidentally, the patent does not dictate the friction, the initial friction imposed by those two nuts, so it could be assumed that no friction is called for. If we have residual friction that might change, a little, the answer, but still it would not make it practical, we don't think. On this tappet is an attached hub, and on this tappet is this attached hub, that spacer in between; this arm consists of a scissor-like movement pivoted at the back and tightened by the thumb-screw at the front, which bears down between the hub of each tappet, this piece here which comes [379] down with a projection, a projection here, which bears at the top of the hub attached to each tappet, and the other portion of the scissor which is fastened to—not fastened, but which bears on the bearing in the center of the two hubs, and as we squeeze those two together like a pincer we squeeze between the top of the hub and the axis, which is this shaft to which the nuts are attached, and that results in the lockup.

If a larger diameter hub were used to get greater

(Testimony of Bertram A. Schwarz.)

holding force, then the rockers would have to expand in size, and if they expanded in size then the angular movement would be still further limited, or the lever would become still longer, and out here the throw would become extremely great, resulting in an extremely large tuner. And I am not sure how far you would have to go before you would begin to get a lock which would hold.

The other alternative is to increase the coefficient of friction by roughening up the surfaces, or by imposing some abrasive like a brake-shoe between this piece and here. I am not sure how far you would have to go in that direction before you would begin to get results. All that would be conjectural.

Mr. Lyon: We offer in evidence the model, Plaintiff's Exhibit 5, for identification, as Plaintiff's Exhibit 5; and the individual lever assembly that goes with the model which [380] has been marked Plaintiff's Exhibit 5-A, for identification, we offer in evidence as Plaintiff's Exhibit 5-A.

Mr. Flam: I object to the offer, your Honor. The Exhibit 5 offered in evidence is not a fair representation of the disclosure of the patent. I doubt very much if it could be maintained that the axis of the tappet will fall in line with the axis of the rocker. The patent teaches that these axes must be coincident or coaxial when the tappet and rocker are brought into position. The use of relatively high torque devices is not prescribed in the patent.

(Testimony of Bertram A. Schwarz.)

The full advantage is taken in the General Motors devices here introduced to reduce the necessary turning force as much as possible, even by using a clutch that declutches the manual knob when the push-button is pushed in. We can demonstrate it, if your Honor would like to have it demonstrated now, how very easily these General Motors condensers do turn. And we will, of course, insist that the use of a condenser which takes that much force to turn and through large multiplication is not a fair exemplar of the disclosure in the patent. Nor is the lock—I haven't measured the relative thickness of the parts that engage. As an example, what can be done in the way of locks——

The Court: Let's not get too confused. Let's talk about one model first.

Mr. Flam: Would your Honor like to see a demonstration [381] of the relative torques?

The Court: I would like to see it demonstrated in your briefs. I am not going to take the time in court to do it.

Mr. Flam: Very well.

The Court: I want it to be understood by receiving the model in evidence that the court is not determining that it is or is not a true characterization of the principles of the patent in suit, but I want the model here and I want you gentlemen to argue in your briefs why you think it isn't, and the other side will, of course, present the phase of it that they contend is, I suppose in conformity. The

(Testimony of Bertram A. Schwarz.)

objection is overruled tentatively, subject to a motion to strike it out in the briefs if the court concludes that it is not a correct model representative of the principles, relevant principles of the patent in suit.

(The instruments, marked heretofore as Plaintiff's Exhibits 5 and 5-A, for identification, were received in evidence.)

The Court: I wanted to ask you a question about the model 5-A, in evidence. Are the measurements of this device the same as those that are shown in Exhibit 5?

The Witness: We have in neither case measured the holding or restraining force of the lock mechanism on the single piece, nor the other, because the patent does not specify anything along that line.

Mr. Lyon: I don't think you quite understood the court's question. The court's question is: Are the parts 5-A exactly the same as the corresponding parts that are included in Exhibit 5?

The Witness: I am sorry. They were made by the same model-maker to the same drawings of the patent, and I am told by the model-maker and by the mechanical engineer supervising it that there was no deviation in the two.

The Court: You did testify about the torque measurement that is found in Exhibit 5 and the torque measurement that you say is utilized by the General Motors in their commercial structure?

(Testimony of Bertram A. Schwarz.)

The Witness: That is right, on the load, that is, the gang condenser. We did not measure the torque of the tuner itself, because we have no guidance on that. The patent does not tell us what the torque should be on the free running torque of the tuner itself.

The Court: That is all I have.

Q. (By Mr. Lyon): I show you defendant's Exhibit H, the Zenith tuner. Can you testify as to why this model tuner was not continued in use in household sets?

I think it is a matter of common knowledge that household sets utilize superheterodyne circuits.

That last statement of mine is correct, isn't it?

A. Yes. [383]

Mr. Flam: Just a moment. I think that calls for a conclusion. I don't know whether the witness knows the answers to this question or on what basis his knowledge——

Mr. Lyons: I will ask him if he knows.

Q. (By Mr. Lyon): Have household sets since 1936 or '35 utilized superheterodyne circuits?

A. Yes, they have utilized superheterodyne circuits.

Mr. Lyon: That is a matter of common knowledge.

Mr. Flam: I didn't understand that part of the question. I am sorry.

The Court: It is generally advertised. I don't know whether it is true or not.

Mr. Flam: That is true enough.

(Testimony of Bertram A. Schwarz.)

The Court: I don't pretend to be a scientist, but I know these advertisements.

Mr. Flam: I misunderstood the question.

Mr. Lyon: I will ask my other question over again and give you an opportunity.

Q. (By Mr. Lyon): Can you testify, based on your own knowledge in the industry and this Zenith tuner like Exhibit H, why tuners of that type did not continue in use in household radios?

A. Yes, I think I can.

Q. Will you please do so?

A. A restraining reason was first the problem in superheterodynes [384] to produce them in mass production. I had in mind spurious responses, things that have nothing to do with the mechanical positioning of shafts, but have to do with producing superheterodynes in the first place. So we had problems like spurious responses, we had problems such as electrical drifts with temperature and humidity, in other words, you tune the radio set, and as the set heated up or after you tuned it it would change to a new position, either due to humidity or temperature, or slight mechanical shock. We had problems of electrically tracking circuits, and that was one restraining reason why no mechanical tuner was considered except for custom-built and higher-priced radios.

The second reason that was advanced to us in the engineering department by sales and management, and we came to the same conclusion was

(Testimony of Bertram A. Schwarz.)

that if we were going to go to the expense of automatic tuning we should first consider the possibility in household sets of providing remote tuning, and remote tuning just about calls for electric tuning of some kind, and that is why electric tuners first appeared and remote tuners appeared in the higher-priced models.

Then the third reason was that it was considered not too important in household to have a tuner which could have the settings changed, because once a set was used in a given locality the settings could be made, and it wasn't too important to change them to new stations. The RCA, Philco, [385] and the Zenith, the three largest manufacturers of household radios, made most of their radios with switch type tuners which were not easily adjusted. They could be set up by the serviceman when installing the set, and they would remain in that position for considerable lengths of time.

The fourth reason advanced was that push-button tuning was of maximum use in an automobile, so that the driver need not divert his attention from the road and could reach over and press a button and bring in a favorite station. But in a household radio if he had to go to the radio set in the first place and tune it, it was almost as easy, they thought, to turn a knob as to push a button. The value of push-button tuning was less.

Q. Can you testify of your own knowledge as to why tuners of the Zenith type, as exemplified in

(Testimony of Bertram A. Schwarz.)

Exhibit H, were not used in automobile radios?

A. The first reason was the limitations of space on the instrument panel. The lever type of tuners require a considerable movement of the lever, they therefore require distances such as shown in this tuner, in addition to the speaker, and in addition to a dial, and to show how serious that limitation was we devised an elliptical speaker, elliptical shape, to try to reduce the height of the instrument panel so that they would have plenty of knee room in a car. A car designer is very reluctant to give up that room. [386] Therefore a lever type didn't work out very well from a size and space standpoint.

Secondly, we submitted to our various customers three types of operation: one, a lever, another a pull type, and a third, a push type. And the customers chose the push type as being most commercially salable. They preferred that type for automobile and commercial use.

In testifying to that I was thinking, also, of Plaintiff's Exhibit 1, which has hinged buttons on there, and there might be some confusion as to my testimony on that, for those hinged buttons were for a different purpose. They were not levers to which tappets were attached, and they did not have the disadvantages of this type of operating lever (demonstrating). They were put there hinged merely to allow the button to be flipped up and to get at the reset screw. And they had an ornamental

(Testimony of Bertram A. Schwarz.)

purpose, and utilitarian, insofar as not having to pull off a button to get to a reset screw, if you wanted square or rectangular buttons.

Continuing with this (indicating), we then took the Schaffer tuner, which was available to us on RCA patents, and modified it and made it a rectilinear push-button type as exemplified by Plaintiff's Exhibit——

Q. 3?

A. 3, and used that in great quantities on Buick and Chevrolet for many years, and it was a modification of this [387] to make it most adaptable to automobile use.

Q. Beginning at page 319 you testified with reference to the type of automobile tuners being used on automobiles supplied from the manufacturer at this time. First you said that the Chrysler models were using a switch type tuner. You modified that this morning by saying that there are some tuners being supplied by another manufacturer you are not familiar with. But as to those that you are familiar with, will you state whether or not they require any more difficulty in adjusting or setting for different stations than a tuner like the adjustable tappet and rocker type.

A. The Chrysler switch type tuners are quite easily adjusted by removing a button cap and turning a station setting screw that is then disclosed, tuning in the station on each of the buttons. That seems a rather simple operation.

(Testimony of Bertram A. Schwarz.)

Am I understanding the question correctly? Does it go beyond the Chrysler?

Q. It includes the Chrysler models here. Would your answer be the same—I mean it includes in my question the feature that the center for the tappet is coaxial with the center for the rocker in this type that you are comparing the switch type to. In other words, when I am speaking of this type for the purpose of this question, of an adjustable tappet and rocker, I intend to include in that type that the [388] centers will be coaxial.

A. The comparison between the two, it is difficult to say. I would think the switch type was as readily adjusted as a rocker and tappet with coaxial centers.

Q. Can you answer the same question as to the current Ford type referred to on page 319 of the record?

A. The current Ford type may require a little explanation, but I believe it is a very simple setup. It has an advancing nut, as I think I have testified, and a spring loaded bar, and the advancing nut setup arrangement is according to the teachings of Marvin. I did not testify to the fact that the Ford and that type of tuner is what is known as a single push-button sequence tuner with a turret. In other words, there is only one push-button on the instrument panel, and as you continue to push it you get a sequence of stations, and it continues to rotate around a turret, and on that turret are adjustable

(Testimony of Bertram A. Schwarz.)

nuts and screws. One at a time is brought into relationship to the tuner bar. The nut which happens to be against the tuner bar at the moment can be set up by pulling out the manual, I believe it is pulling out—it could be push-in—but I think it is pull-out on the Ford, and thus engaging the manual with the screw and adjustable nut, and you rotate the nut, changing its position and thereby changing the position of the tuning bar. In other words, you tune the station in on each button [389] position. If you want to set it to another position you press the button to that position, until that position is reached, and again pull out the manual, rotate it, setting up the station.

Q. How does the ease of adjustability or set-ability of that device compare with the tappet and rocker with coaxial center type of device?

A. I think it is at least as easy and perhaps easier than the type which requires rotating unlock and rotating lock of tappet adjustment.

Q. Can you answer the same question with reference to the Packard type of tuner referred to by you at page 320 of the record?

A. The Packard type of tuner is the same general principle of the Ford but is a little easier to explain, but no more difficult to set up.

Q. Can you answer the same question with reference to the type of—I think you have already stated that the Kaiser-Frazer is the same as the Ford?

A. Yes, the Kaiser-Frazer and the Nash is the

(Testimony of Bertram A. Schwarz.)

same as the Ford, and the Studebaker is the same as the Packard.

Mr. Lyon: At this time I would like to offer in evidence as Plaintiff's Exhibit No. 6 the accused tuner which was filed with the complaint as Exhibit 1 to the complaint.

The Court: So ordered. [390]

The Clerk: Plaintiff's Exhibit No. 6 in evidence.

Mr. Flam: Did that have a defendant's number?

The Clerk: No.

(The instrument referred to was marked Plaintiff's Exhibit No. 6, and was received in evidence.)

Mr. Lyon: I would like to offer in evidence as Plaintiff's Exhibit No. 7 the tuner filed with the complaint as Exhibit No. 2 to the complaint.

The Court: It is so ordered.

The Clerk: Plaintiff's Exhibit 7 in evidence.

(The instrument referred to was marked Plaintiff's Exhibit No. 7, and was received in evidence.)

Mr. Lyon: You may cross-examine.

Cross-Examination

By Mr. Flam:

Q. You were talking today and Thursday about a switching type of tuner for automobile radios.

A. Yes.

Q. I think you said that the switching type does

(Testimony of Bertram A. Schwarz.)

not use the feature of coaxiality referred to in the Leishman patent?

A. That is my interpretation of it.

Q. There isn't any tappet or rocker in the switching type of tuner, is there?

A. Not that I would classify as a tappet or rocker. [391]

Q. In order to explain your testimony about switching type of tuners——

The Court: Is that a new one or is that one we have had?

Mr. Flam: This is a switching type of tuner, I believe. I would like to show that to the witness and ask him whether he recognizes it as such.

The Witness: Yes, I believe this would be a switching type of tuner.

Q. (By Mr. Flam): Will you explain that to the court while you have it in your hands?

A. Let me get my glasses on to see the details.

Each of the push-buttons latch in, holding them in position, which of course is not necessary in the normal rocker and tappet type of tuner. They, therefore, hold in switch contacts. Let me see if I can locate the switch contacts.

Q. Aren't the switch contacts——

A. Right here, those springs here. And there is another bank of them here. The switch arm, therefore, throws this switch onto this bar, bringing in any one of pairs of trimmers in this case, these are fixed or previously-adjusted banks of tuning con-

(Testimony of Bertram A. Schwarz.)

densers; whichever one is thrown, therefore—I now bring these two condensers into the circuit, and they are set up on a station (demonstrating).

Q. (By Mr. Flam): Then, as I understand your testimony, [392] in the switch type of tuner all you do is to switch in pre-tuned circuits, one circuit at a time, depending upon which push-button you push, is that right?

A. That is correct.

Q. But there is no tappet and rocker——

A. There is no tappet and rocker that I could determine as such.

Q. Each button is like any other button, isn't it, all it does is to close contact?

A. That could be, yes.

The Court: Do you think that principle of co-axiality is present in that?

The Witness: No, I don't see how that could be considered to be present in that tuner.

Mr. Flam: I offer this exemplar of the switch type of tuner in evidence.

The Court: It will be received.

Mr. Lyon: No objection.

The Clerk: Defendant's Exhibit ZZ in evidence.

(The instrument referred to was marked Defendant's Exhibit ZZ, and was received in evidence.)

Q. (By Mr. Flam): I think you mentioned the Marvin tuner shown in patent 1,704,754, which I

(Testimony of Bertram A. Schwarz.)

think is No. 3 in our book. Do you have a copy of that?

A. I did mention a Marvin tuner. I haven't the number [393] before me to refer to. My recollection is that I referred to a figure 9. I don't find a figure 9 in this, but it seems to be the one.

The Court: It is down in the corner.

The Witness: This seems to be the same one. I would say this was the mechanism I had reference to.

Q. (By Mr. Flam): Do you find that patent, Mr. Schwarz?

A. No, I have not, yet. Does it have an index number reference here?

Q. Yes, on the first page. Do you believe there is another Marvin patent?

A. Only that my recollection told me that there was a figure 9. I may be wrong in that. I don't see the figure 9 here, but this seems to be the same general type of mechanism that I testified to and that I have reference to.

Q. Isn't that the same patent that Mr. Lyon showed you when you were testifying on direct?

A. That is the point I am not sure about, but the figure seems to cover the same general setup mechanism arrangement, yes.

Q. Is that the type of device that General Motors had been supplying to various automobile manufacturers?

A. As I testified, I believe this has been sup-

(Testimony of Bertram A. Schwarz.)

plied, or this type of lock-up mechanism was supplied to United Motors, Chevrolet, Oldsmobile and Cadillac. [394]

Q. Isn't it true that in this type of tuner there isn't a rocker and a tappet that engages both arms of the rocker?

A. That is true. There is only a single rocker, as I think I so testified. There is a single bar, rather. Whether you would call it a rocker, or not, I don't know.

Q. I call your attention to Figure 2 of the patent on sheet 1 of the drawings; do you notice the links 42 and 43? A. Yes.

Q. Were those the type of links that you used in the Marvin tuners that were furnished?

A. No. I tried to make it clear that the main thing was the advancing nut and the screw.

Q. Isn't there an advancing nut and screw?

A. Advancing nut or screw. In this case it is an advancing nut. We did not use the linkage arms shown.

Q. You eliminated the linkage arms?

A. Yes.

Q. And the advancing nut or screw would be adjusted to a definite point?

A. That's right.

Q. To determine which particular position the tuning device was to be set to, is that right?

A. That is correct. [395]

Q. And that nut would do what to determine that position?

(Testimony of Bertram A. Schwarz.)

A. The nut would advance or retard. It would change its——

Q. Would it move an arm against a spring, is that the way it would behave?

A. No. As you depressed the assembly consisting of the screw and the nut, the nut would then come in contact with a spring loaded bar in our particular tuner, and the distance back or forward that the nut was, or the distance back or forward that the screw was, if it was reversed, would determine the angular setting or would determine the distance in or out of the iron core tuning——

Q. There wouldn't be any problem involving coaxiality or non-coaxiality?

A. It doesn't involve coaxiality at all.

Q. How about this spring? You say that the bar or arm is urged to one position by the loading spring, is that what you said?

A. We have termed it a spring loaded bar, the bar doing the tuning.

Q. And that spring loading the bar adds to the resistance to turning of the tuner, doesn't it?

A. That is correct. [396]

Q. I hand you a tuner and ask you whether that embodies the principles that we have been discussing, the rocker and tappet which become coaxial when the plunger is moved to the fully engaged position?

A. Looking at it by eye I would say that the center of the tappet was not coaxial with the rocker but I wouldn't know that without measurements.

(Testimony of Bertram A. Schwarz.)

I refer to the center of that rivet holding the tap-pet to the arm. The center of that rivet looks to me as if it was not in line with the center of the rocker here and here.

Mr. Lyon: May we have the device identified that the witness has referred to?

Mr. Flam: Oh, yes. This is the Colonial tuner that has been used and is being supplied for use on standard Hudson cars.

Mr. Lyon: I didn't mean that.

The Court: He means to mark it for identification.

Mr. Flam: I will have it marked for identification first, your Honor.

The Court: Did I understand you to say, Mr. Schwarz, that you did not find the coaxial properties in the exhibit that is now marked for identification?

The Witness: As I see it by eye I would have to—you would have to measure it to be sure whether it departs and how much it departs from coaxiality. But it appears to [397] me to be a departure from coaxiality.

The Court: Is there any fixed definition as to what is meant to be engineers by "coaxiality"? Is it defined with precision from an engineering standpoint or is there any variance?

The Witness: I wouldn't know how to define it, your Honor, because there has to be manufacturing tolerances, but I would expect those to be in thousandths. If I could see it to the degree that it

(Testimony of Bertram A. Schwarz.)

appears to be off center I would think it is more than a few thousandths.

The Court: Well, in the utilitarian aspect of the radio is it necessary to have the tuning device actuated with the nicety of a one-thousandths clearance?

The Witness: If other aspects are taken care of greater and greater the departure can be had of any one aspect and that includes coaxiality. In other words, if we took care of excellent plunger fit or had light loads or had other characteristics in the tuner then we can take other things in our stride.

I don't know how to say how important coaxiality is. I think it is a good feature but as I think I testified I don't think it is a major one.

The Clerk: Defendant's Exhibit AAA marked for identification.

(The document referred to was marked Defendant's Exhibit AAA for identification.)

Q. (By Mr. Flam): Now, Mr. Schwarz, I want to call your attention to the location of the pivot for the rocker. It is on this side over here?

A. That is one and the other is a screw over here that I was looking at. It is right here—the center of the screw. I was trying to line them up by eye and that is a little difficult to do but lining them up by eye with the center of the rivet head which holds the tappet under the plunger, it appears to me that they are not coaxial, but that is purely a guess without measuring equipment.

(Testimony of Bertram A. Schwarz.)

Q. Can you look at it again and see whether as a matter of fact those two parts become substantially coaxial?

A. In other words—"substantial" is a difficult one.

Q. Or coaxial?

The Court: "Substantial."

Mr. Lyon: Judge Tuttle, when I was trying a case before him and the word "substantial" came up, he said:

"I am 73 years old."

He said:

"When I was born I didn't know what the word 'substantial' meant and I don't know now and I don't believe I am ever going to find out."

The Court: I thought maybe Mr. Schwarz could tell us but I see he can't.

Q. (By Mr. Flam): In your opinion? [399]

A. All I could say is that it comes close but by that definition, if that is usable——

The Court: Do you think it is coaxial, Mr. Flam?

Mr. Flam: I think it is coaxial to the extent required by the teaching of the patent. I think we can make measurements and I propose to do so and show that it is—that it is very close to coaxiality. Of course we could use the test we have been talking about over here with the tappet loosened and turning the rocker. You don't notice any rise or fall of it.

A. Can I ask a counter-question? I don't know whether this is the correct procedure but it seems

(Testimony of Bertram A. Schwarz.)

to me even with coaxiality if you had any eccentric in the tappets or the rocker bars on one side or on the other you would get movement the same way. I don't think it is an infallible test.

Q. (By Mr. Flam): Well, I guess then we shouldn't ask you to apply the test. Do you recognize this tuner, Exhibit AAA as a tuner used in the current model of the Chrysler cars?

A. No, I cannot, because I have never seen those models of the Chrysler cars.

Q. That is the Plymouth and DeSoto lines.

A. No, I don't know where it is used or how much it is used. [400]

Mr. Lyon: If you say it is I am willing to accept it without proof because it is a matter of common knowledge to somebody and we don't need to have witnesses to prove it.

Mr. Flam: We are prepared to prove that that particular model—I have a circular of the so-called Mopar radio which describes the same tuner, I believe, and it is stated as used for the current series and 1941 and 1942 Plymouth, Dodge DeSoto, Chrysler passenger cars and also the Dodge trucks, and the Mopar radio identified there we have found is the radio—the tuner of that radio is this type of tuner made by the Colonial people.

Mr. Lyon: I am willing to accept all of that without any proof if it is understood that the circular doesn't mean that all——

Mr. Flam: No, no.

(Testimony of Bertram A. Schwarz.)

Mr. Lyon: All Plymouth, Dodge, DeSoto, Chrysler and so forth had that equipment as of that date.

Mr. Flam: No, I am not alleging that.

Mr. Lyon: You just mean that some of those have been put on those models and that is as far as the fact goes, I think.

Mr. Flam: Well, of course there is no saying about what the proportions are one way or the other. I wouldn't be prepared to prove that unless I subpoenaed some records from Detroit. [401]

Mr. Lyon: I am willing to accept the circular without proof with the understanding that it is to be interpreted in the way we have just stated, your Honor, on the particular point that we have just discussed.

Mr. Flam: I will offer it in evidence, Defendant's Exhibit AAA for identification and also the circular that has been discussed.

The Court: It will be received and marked filed.

(The documents referred to were marked Defendant's Exhibits AAA and BBB and received in evidence.)

Q. (By Mr. Flam): Now, Mr. Lyon, I understand that this tuner I have in my hand now is in current use on Hudson automobiles and some of the Mercury, Lincoln and Ford and Ford truck models as well as some of the Nash models and Willys and Crosley. Are you willing to stipulate the same for this particular tuner?

(Testimony of Bertram A. Schwarz.)

Mr. Lyon: If you show it to the witness and ask him if he knows anything to the contrary.

(Handing object to the witness.)

The Witness: I have never seen this tuner before and I was not certain what type of tuner Hudson was using. I knew the Hudson in 1947 but I didn't know the Hudson in 1948. The one in 1947 was the same as the Ford. The new Ford I don't believe is out yet and therefore I could not state what the new Ford is. [402]

The new Mercury and the new Lincoln I know have changed the tuner. What the tuner is I have not had an opportunity to find out yet. I have studied the old tuner quite thoroughly and this is not it. The old Nash I studied quite thoroughly. The new Nash I have no indication whether or not they have changed.

Mr. Lyon: What is the old Nash type?

The Witness: The old Nash type was the same as the old Ford which was the one I think I testified to, was the single button sequence tuner with the advancing nut and spring loaded bar.

Mr. Lyon: If you have some printed matter here that is reliable it will be all right. We don't want you to go to a lot of proof on things that can be found to be true in other ways.

Mr. Flam: That tuner, your Honor, is referred to in manuals, service manuals for Hudson automobiles—the receivers of current type and I have

(Testimony of Bertram A. Schwarz.)

a photograph of the page from the manual showing that tuner.

Mr. Lyon: May I have a copy of that?

Mr. Flam: I think we have copies but we will need to use this one. We can supply you with a copy.

And here are photographic copies of pages for the Ford truck manual, which shows the same tuner with the associated radio set. And when I say "associated" I mean [403] associated without capitalizing it.

Mr. Lyon: What does it mean?

Mr. Flam: I mean the Zenith radio and not the Associated wholesale case.

Mr. Lyon: May we take these up one at a time and dispose of them one at a time?

Mr. Flam: All right. Do you want to dispose of the first one I showed you?

Mr. Lyon: The first one is the manual for the Hudson car and the specimen of the Hudson tuner. Are you prepared to say to what extent these are used on the Hudson cars or is the understanding to be that they are just used to some extent on the Hudson car?

Mr. Flam: They are used on Hudson cars. That is the way I would say it without precluding the possibility that there may be other tuners used in connection with Hudson cars.

Mr. Lyon: That is all right. I will agree to that and waive proof of the model and of the catalog.

(Testimony of Bertram A. Schwarz.)

The Court: It may be marked accordingly, Mr. Clerk.

Mr. Flam: Now, you have the Ford truck. The same situation obtains there.

Mr. Lyon: Is that the same tuner?

Mr. Flam: Yes; you can see the pictures on the pages of the manual. [404]

Mr. Lyon: The understanding is the same, that some of these tuners are used on the Ford trucks without excluding the possibility of other tuners.

Mr. Flam: Yes. Of course as far as we know these are the only kind——

Mr. Lyon: We don't know whether they are or are not. I am willing to waive any proof of the Zenith manual, your Honor. I think these ought to be given identification numbers as we go along.

Mr. Flam: I offer the three pages, referring to the Hudson car and—two pages and the photograph in evidence.

The Court: It will be received and marked filed.

The Clerk: Defendant's Exhibit CCC in evidence.

(The documents referred to were marked Defendant's Exhibit CCC and received in evidence.) [405]

Mr. Flam: I offer the three sheets, photographic copies of the service manual for Zenith auto radio for Ford trucks.

The Court: It will be received and marked filed.

(Testimony of Bertram A. Schwarz.)

(The documents referred to were marked Defendant's Exhibit DDD, and were received in evidence.)

Mr. Lyon: Are these factory equipped or just models that are being sold?

Mr. Flam: No, I understand they are factory equipped.

Mr. Lyon: Mr. Flam has shown me the Zenith Service Manual which says for Lincoln and Mercury cars, part numbers so and so, and I will waive any proof of this manual with the same understanding that these devices have been put on Lincoln and Mercury cars but not excluding the fact that other types of tuners may have been used on the same cars.

Mr. Flam: Very well. I will offer the two pages relating to the service manual for Zenith auto radios for Lincoln and Mercury cars.

The Court: It will be received and marked filed.

(The document referred to was marked Defendant's Exhibit EEE, and was received in evidence.)

These are really duplicates are they not? I don't know whether the verbiage is the same but the drawings seem to be the same.

Mr. Flam: The drawings are duplicates showing that this [406] same tuner has been used in these cars that I mentioned.

I have at hand a photostatic copy of a letter or

(Testimony of Bertram A. Schwarz.)

circular having the Zenith radio Corporation letter-head and relating to the Zenith automobile radio service bulletin No. 5. This is dated May 1st, 1948. I would like to offer that in evidence if opposing counsel will stipulate that we can waive proof of the original.

Mr. Lyon: This is just a sales letter issued on March 1st, 1948, by the Zenith Radio Corporation.

Mr. Flam: It is not a sales letter. It is a service bulletin. That is what it is entitled.

Mr. Lyon: Bulletin No. 5.

Mr. Flam: That is right.

Mr. Lyon: Of the Zenith Radio Corporation. We will stipulate to it as being a bulletin that was issued on the date appearing on the bulletin by the Zenith Radio Corporation, your Honor.

Mr. Flam: I offer the photographic copy in evidence.

The Court: In other words, the authenticity of it is waived.

Mr. Lyon: Yes.

The Court: And that it was regularly issued?

Mr. Lyon: Yes.

The Court: So ordered.

(The document referred to was marked Defendant's Exhibit FFF, and was received in evidence.) [407]

Mr. Flam: Will you state that this is the tuner described in the circular?

(Testimony of Bertram A. Schwarz.)

Mr. Lyon: Is this the Zenith set shown in the Zenith bulletin?

Mr. Flam: I offer in evidence an exemplar of the Zenith tuning mechanism corresponding to the tuning mechanism referred to in the several bulletins just offered and received in evidence.

The Court: Any objection, Mr. Lyon?

Mr. Lyon: You are offering in evidence this model that you just handed to me?

Mr. Flam: Yes.

Mr. Lyon: As a specimen of the models referred to in the Zenith service manuals that are here in evidence?

Mr. Flam: Yes.

The Court: As an exemplar?

Mr. Lyon: Yes. We have no objection and understand that is what the model is, your Honor.

The Court: It will be received and marked filed.

(The document referred to was marked Defendant's Exhibit GGG, and was received in evidence.)

Q. (By Mr. Flam): Mr. Schwarz, will you examine this tuner, Exhibit No. GGG, and state whether in your opinion the tappet and rocker becomes coaxial in the fully engaged position, having due regard to the position of the shaft upon [408] which the rocker is mounted?

A. This looks to be closer than the other tuner that you showed me—the Colonial tuner, I believe it was. I would say that it is closer to being coaxial.

(Testimony of Bertram A. Schwarz.)

Mr. Lyon: May I ask a question, Mr. Flam? We are talking about being coaxial here. Are we talking about this pivot of the tappet being coaxial with the center around which the two bars of the rocker turn or around some other pivot out here at the side which may not coincide with that center?

The Witness: I have been lining it up with the pivot of the assembly of the rocker but as pointed out, that is not a conclusive proof that the pivot is necessarily a point centered on the two bars or whether it is on the two edges of the bars.

Mr. Lyon: This point did not come up before in connection with this and brought to your Honor's attention. In other words, the center between the two bars is not, apparently, the pivot on which the rocker is mounted and I don't know as to which the witness is answering. I don't know whether he noticed that.

The Witness: I had not considered that. I was thinking in terms of the pivot point of the assembly of the two bars rather than the centers of the two bars, or, rather, than the top of the two bars. I hadn't paid any attention [409] to the position of the two bars relative to the pivot of the assembly of the rocker.

Q. (By Mr. Flam): Now, I think to clarify that, when we talk about "Coaxial parts" in a rocker and tappet assembly we have meant right along that the axis of rotation of the rocker be considered irrespective of the shape of the rocker

(Testimony of Bertram A. Schwarz.)

itself and with that axis of rotation of the rocker in mind, can you now say whether the axis of the tappet will be in line with the axis of rotation of the rocker?

A. It appears to be quite close if not actually coaxial with the center of rotation of the assembly of the rocker.

Q. Now, I show you again this other model, Exhibit AAA in evidence. I think that is the Colonial tuner. And with that understanding in mind that you are to refer to the axis of rotation of the rocker, can you now state better whether in your opinion that is coaxial when the tappet and rocker are in full engagement?

A. It doesn't help me because that is the way I was looking at it before and it still seems to be somewhat farther apart than the other tuner by eye.

Q. You have testified about plaintiff's exhibit 3. I think you said that this was one of the first tuners that was developed as distinguished from a motor-driven tuner.

Mr. Lyon: Can he look at Exhibit 3 to be sure, Mr. Flam? [410]

(Object handed to the witness.)

The Witness: If I recollect, my testimony had reference to the automobile use of tuners and I testified that this was one of the first. I couldn't testify as to what was the first mechanical push button tuner used in automobile radios.

(Testimony of Bertram A. Schwarz.)

Q. (By Mr. Flam): Well, aren't you aware of the fact that this—I will rephrase the question. Isn't it a fact that this tuner, Exhibit 3, did not go into production until July of 1938?

A. That is correct.

Q. When did you first get the idea of developing a push button tuner?

A. We started work on this in the latter part of 1936 or the first part of 1937, on the idea of mechanical push button tuners and electrical push buttons for automobile radios.

Q. Now, I think Mr. Lyon asked you for some idea as to how many tuners of the Exhibit 3 type before you, were produced by General Motors. Can you recall the figures you gave.

A. I said there was about 100,000 produced per year for Buick and a similar quantity for Chevrolet, and I recollected that the Buick tuner was in use for two, going on three—that is a part of 1940 model. It went into production in 1938 and was used in 1939 and at least a part [411] of 1940 at Buick, and it was used on Chevrolet during most, if not all, of that period of time, and I would place the total quantity, therefore, as 400,000 to 500,000 tuners.

I have not the figures before me but it is of that order of magnitude.

Q. Now, I think Mr. Lyon also asked you about the amount of or the quantity of tuners of the Marvin type with the advancing nut that you just

(Testimony of Bertram A. Schwarz.)

talked about a little while ago. How many of those were sold by General Motors?

A. I don't recall the quantity. We used them on all of the Oldsmobile—all of our Oldsmobiles and all of our Cadillac tuners in 1941, '42 and 1946 and 1947. We used them also on the United Motors tuners in 1941, or 1939 to 1942. That total quantity, I would say—I would have to do some very quick estimating—let me think. All I could say it was over 100,000 and there could have been 200,000 or 250,000.

Q. Showing you Exhibit LL, how many of these tuners did General Motors make?

A. We didn't make any of this tuner that you hand me here. This tuner was bought in its entirety except possibly for the lock-up screw put on here and some other attachment on the outside. This gang tuner was purchased from two sources before the war and one source after the war.

Q. How many of them were actually used by General [412] Motors? I will put it that way.

A. By General Motors? It would include tuners of this same type supplied by R. C. A. to Buick and that figure I haven't before me. The ones we supplied, we supplied in the latter part of 1940, 1941, 1942 and the beginning of 1946 for Buick. That would place it at over 200,000 for the Buick. And then we had tuners used up to now and it is continuing in Pontiac—in our Pontiac DeLuxe set, and we used that in the years 1941, 1942; 1946 and 1947, and continuing in 1948. The Pontiac quanti-

(Testimony of Bertram A. Schwarz.)

ties I do not have before me but I might guess them to be in the order of 50,000 a year during those years. Let me see, that is 1941, 1942, and 1946 and 1947. There would be over 200,000 there.

Q. What other cars were they provided for? Were they all for Buick and Pontiacs?

A. We used it for a short period of time—I am not sure of that. Those are the only two that I can testify to with certainty.

Q. Now, the General Motors tuner, Exhibit JJ in evidence, can you state how many of those were sold by General Motors?

A. We put this on our Chevrolet in 1941, I believe it was, and we continued in 1941, 1942, 1946, 1947, and we are continuing it in 1948 on the Chevrolet. That is the Chevrolet DeLuxe. It is not used in the Chevrolet truck. [413] In the Chevrolet DeLuxe it would be something more than 100,000 a year during those years of 1941 and 1942. That would be 400,000—more than 400,000. And in 1946—I am sorry—in 1946 the Buick was changed from a condenser—I mean this type to this type. I am not sure but what I included the condenser tuner for Buick. That should have been this model.

The Court: Please refer to them by exhibit number.

The Witness: I am sorry. Exhibit LL, Defendant's Exhibit LL I refer to as the condenser tuner used on the Buick and Pontiac and I in error continued to consider the figures of usage of tuner

(Testimony of Bertram A. Schwarz.)

LL at Buick in 1947, whereas, actually, in 1946 the change was made at Buick to a tuner exemplified by Defendant's Exhibit JJ.

Mr. Lyon: I am not sure, your Honor, whether the record is clear as to these figures. I don't know whether the record shows that these are the tuners which the witness' division has manufactured that he is speaking of or whether they are tuners that the General Motors Corporation has used of this type and have purchased elsewhere, because in view of some of these other decisions many of these tuners are supplied by Radio Condenser and General Instrument Company.

Mr. Flam: Maybe I had better inquire again, Mr. Schwarz, and let us keep the record straight.

Q. (By Mr. Flam): I will ask you now, first, about [414] Exhibit LL. This shows a tuner that I think you said was supplied by Radio Condenser?

A. And General Instrument, both of them.

Q. And this model, LL, shows a condenser, variable condenser that is operated by the tuning device?

A. Yes.

Q. Now, without regard to whether a condenser or a permeability tuning is used, how many of this type of tuner was purchased and used by General Motors?

A. That clarifies it in my mind because I was wrong in some testimony on the Exhibit JJ.

Q. Go ahead with reference to LL.

A. Reviewing the testimony on Exhibit LL,

(Testimony of Bertram A. Schwarz.)

tuner LL with a condenser or the iron core version——

Q. Or any other type for that matter.

A. Those were the only two that were used. I can only testify as to those which were put in the Delco Radio Division sets. I cannot testify to those which were put in by the Radio Corporation or any other supplier to the corporation.

But returning to the testimony I can give on Delco Radio, Delco Radio used this tuner in condenser or iron core form——

Mr. Lyon: When you say “used this tuner,” you mean they manufactured it or bought it from Radio Condenser and General [415] Instrument?

The Witness: They were bought as the condenser version or they were bought as the iron core version. It is difficult to say where the break-off comes. We made more of them as we went along.

Q. (By Mr. Flam): So far as the plunger part is concerned weren't they all bought from the same source?

A. As far as the plunger mechanism is concerned, we finally wound up by making the entire tuner ourselves but that came in 1946.

Q. Now, irrespective of whether you made it or whether it was sold to Delco, how many of those tuning devices were employed in sets sold by Delco?

A. I would have to study that for a moment. They were used in the Buick, Pontiac and the Chevrolet—the Buick beginning late in 1941 and the Chevrolet in 1941 and the Pontiac, I believe in

(Testimony of Bertram A. Schwarz.)

1941, and they were continued up to the present time and they are being continued during the 1948 model year. I would place the quantity in those three-car divisions of this tuner, whether we bought it or made it, whether condenser tuned or iron core tuned at, I would say the figure might be about one million tuners.

Q. Now with regard to the tuner mechanism shown in Exhibit JJ and without regard to whether it was used for adjusting condensers or for permeability tuning, how many [416] of such tuners were manufactured and sold by Delco?

A. Until 1948 it was only used on the Chevrolet truck. The Chevrolet truck quantities I don't know. I think they might be twenty to thirty thousand in 1947. They are being used this year and I wouldn't know the break-off point but they started in production at Oldsmobile and at Cadillac in addition to continuance on the Chevrolet truck.

Q. And what are the manufacturing schedules, do you know, as to quantities?

A. The 1948 model year is expected to be a short one and I think it might be of the order of 125,000 of these this year plus 20 to 30 thousand last year. That is conjectural because I don't know whether the schedules will be maintained.

Q. Then isn't it true that the tuner employing the coaxial rocker and tappets have been used in far larger numbers by General Motors than all the other types of automobile tuners combined that they have made?

(Testimony of Bertram A. Schwarz.)

A. I believe the figures I have just given would testify to that.

Q. I show you Exhibit E, which is known as the Marschalk tuner. Now, can you go through the process of adjusting that tappet mounted on the lever in that tuner?

A. I have never seen this tuner before so I would be at a disadvantage to operate it for the first time.

Q. You have heard the testimony about it. Did you see Mr. Leishman demonstrate how it was adjusted?

A. I heard some of the testimony. I didn't pay a great deal of attention to it. I would have to review that.

Mr. Lyon: The witness was not here the first day of the trial, I believe, and I don't think it is proper cross-examination. He wasn't examined about this model or about the device that that model represents.

The Court: Not unless he has an opportunity to look it over and carefully inspect it.

Q. (By Mr. Flam): Mr. Schwarz, in this Marschalk model, Exhibit E, a rotatable rocker is shown and a weighted lever. Mounted on the lever is a tappet pivoted on a pin. The mode of operation once the tappet is tightened, you will recognize, is quite similar to the mode of operation of these other tuners. Do you see that?

A. Yes, I can see that.

Q. Now, when it comes to the operation of adjusting the tappet to the position of the rocker

(Testimony of Bertram A. Schwarz.)

do you think you can now try to adjust that tappet to correspond to the position of the rocker and demonstrate that to the court?

A. I would like to try that first and see what the problems are. Immediately one thing becomes evident to me and that is that there is no restraining means and I only have two hands and I have to hold the lever down and try to [418] restrain the rocker at the same time. Would that be a fair representation of the method in which it would be used?

Q. Could you with care?

A. If I had a third hand I might be able to hold the rocker and push the button down.

Q. You are pressing very firmly upon the end of the lever, are you not?

A. Well, I don't think any more firmly than I would normally do with any tuner.

Q. You would have to use that much pressure to set the tappet properly, is that right?

A. I don't know that I am using any more than I would use with a normal tappet tuner. I am now trying to restrain the rocker, hold the button down and lock up at the same time.

Q. Well, in other words, if you had to take care about using very little pressure on the lever that would not be a very satisfactory way of adjusting the tappet, would it?

Mr. Lyon: I don't understand that question, your Honor. The witness has not said he has done anything abnormal in trying to set this exhibit that is before him.

(Testimony of Bertram A. Schwarz.)

The Witness: It is perfectly free and there is no restraint on that and therefore I am trying to give it restraint that a load would give and at the same time pull the lever down and at the same time lock it. It makes it a [419] little bit more difficult to evaluate the usefulness of the tuner without measurements. Offhand it looks like it is a workable device but offhand I would have to make measurements to see how workable and how accurate. I wouldn't be able to say from this kind of a test how bad or how good it was. [420]

Q. When you adjust the tappet in one of the General Motors type of tuners, the plunger is pushed in with considerable force to cause the tappet to assume the position of the rocker, isn't that right?

A. Again the word "considerable" comes into play. We put a residual force on all tappets anyway, and this doesn't have any, so that it doesn't flop around too easily. In other words, if you should back away a little bit while you were tightening it up the tappet could be expected to retain the position that you set it. In this device I have to be sure that I am keeping it in contact, as it is built here, in contact with the treadle. I am not sure whether that is giving it its due or not.

Q. Supposing we do this, loosen the tappet, adjust the rocker to the position required, and then very carefully try to bring the tappet into contact with the rocker and no more (demonstrating), even there you saw that the rocker traveled a little.

(Testimony of Bertram A. Schwarz.)

A. That isn't fair. There is no load at all on that rocker. That rocker just flops around. I wouldn't want to build any tuner to any specifications and expect it to do that. Certainly not a production tuner. I don't know how well-built that is. I wouldn't expect that to be possible with any tuner. Our experience has shown that we have to apply restraint on this, while you are doing it. Even with the greatest care we still have complaints about accuracy of [421] tuners.

Q. How much restraint, do you know, exactly?

A. I don't, no. We would like to see people do a two-handed setup, manually tune while they are setting, unless you use the Marvin type which always uses a single setup. The Marvin sets up on each screw. But whether or not you can get people to do that, I don't know. If you don't do that, then you certainly want to be sure that they restrain this thing and well-bottom the job before they do tighten it.

Q. In this Exhibit JJ, can you demonstrate how that tappet is adjusted in connection with the rocker?

A. This Exhibit JJ is not complete. It doesn't have the restraining force of the worm drive. It has a worm drive, which I think I have testified to as being irreversible. It has a mechanically-operated clutch in this case, and a mechanically-operated clutch is disabled during the tuning stroke—I should say the setting-up stroke—for just the reason I have mentioned. In other words, as we

(Testimony of Bertram A. Schwarz.)

pull out the push-button to be operated, this finger does not contact the clutch-operating bar, as you push it in. It won't operate that clutch-operating bar. And the worm drive remains as a restraint on the treadle bar. As you push it in, push it home, it sets itself first on here, and then begins to lock up, then she operates the clutch, and as you [422] operate the clutch normally it disengages the worm. We have considered that a very important feature. No matter what tuner we have we feel that it is important to restrain that bar, or to retain control of that bar during set-up of the tappet, whether you have coaxiality or not.

Q. Have you made any measurements of the torque in inch ounces that would be required to move that rocker?

A. I haven't them before me, but I know we have gone through that very carefully.

Q. Here is Plaintiff's Exhibit 6 in evidence. Can you demonstrate the extent of the restraint on the rocker when this device is being adjusted?

A. Yes. This device does not have an electric clutch. It has a mechanical brake, which in all cases is removed, whether setting up or whether tuning, but in all cases it has a high frictional load due to the spinning manual, and due to the string drive pointer, and that restraining point makes it just possible to set up the tuner, one handed setup, but we prefer and we constantly teach, although our commercial people don't always do it, we con-

(Testimony of Bertram A. Schwarz.)

stantly teach that the preferred way of setting up is to push in and to rotate the manual with this type of tuner, and thereby retain the control of the treadle. But if they don't do that they still have the restraint of this spinning manual and the string drive which adds a considerable frictional load to the tuner. [423]

Q. In your direct examination you gave some examples, outside of automatic tuners, in which one member is made coaxial with another member. Can you think of any other cases in which the axis of one member has been made coaxial with another?

A. I was thinking of lining up bearings at the time, or lining up wheels, so they rotate in the same plane, in the same circle.

Q. Any other examples?

A. No. I cannot think of the specific usage, clock gearing, or something of that sort in which the two gears are put concentric. I know we are always troubled with pitch diameter concentricities when two gears are operating co-operatively on a common shaft, when put adjacent to each other, particularly.

Q. In all those cases the coaxial axes stay coaxial throughout the range of operation, isn't that right?

A. You want them to.

Q. What did you say?

A. You want them to. Is that the answer?

Q. Would you make the front wheels of an automobile coaxial? A. Yes.

(Testimony of Bertram A. Schwarz.)

Q. Irrespective of the fact that the king pin—that the wheel has camber and tilt? [424]

A. I did neglect that at the moment. That is right. I didn't think of that. You would have caster and camber to consider in the front wheels of an automobile.

Q. So you wouldn't make them coaxial?

A. No, for another reason.

Q. How about the rear wheels?

A. I couldn't testify to automobile wheels. I would have to study the special problems of turning around corners and the special problems of non-skidding and easy-steering and non-wearing of tires, all of which have a bearing on the way the wheels happen to be tilted, one with respect to the other, and deliberately not made coaxial.

Q. Isn't it true, then, in all those examples that you have been able to find you make things coaxial only when there is some known reason for doing so?

A. Yes.

Q. That is, in a case of the front wheels of an automobile you wouldn't make them coaxial?

A. You have a reason for not doing so. You might start by making them coaxial and find by experience and trial that you would not want them coaxial. Just as in this case you might start the other way and quickly find that you would want them coaxial.

Q. In each of these examples, isn't it true that the coaxial relationship has been used to facilitate

(Testimony of Bertram A. Schwarz.)

rotation, [425] such as these coaxial bearings and shafts?

A. To prevent bind or elliptical movements, yes.

Q. So as to make it easier to move the parts?

A. That is right.

Q. So that rotation would be facilitated?

A. That might be one purpose of it. Again you would have to fit it to the specific problem. You may not want them to move too freely, and yet you may not want them to try to take different circles of movement. You might want to deliberately put friction in them, for example. You may not want to put friction in that form.

Q. Have you seen this exhibit, Defendant's Exhibit M?

A. I don't recollect seeing it before.

Q. This is an exhibit introduced on behalf of the defendant to illustrate the important features of the Leishman patent in suit. You will notice there is a tappet and a rotatable rocker. Isn't it true that when you loosen the tappet in this exhibit and move the lever down that it will not in the least bit disturb the setting of the rocker? I mean when the tappet is loose.

A. The tappet is loose now, as far as I can see, very loose, and it has moved the rocker right there.

Mr. Leishman: Press it by the button. You are pressing it by the lock the other way.

The Witness: Yes, it has conformed to the rocker and [426] the rocker doesn't seem to have moved.

(Testimony of Bertram A. Schwarz.)

Q. (By Mr. Flam): In this case the rocker is quite free to move, isn't that right, that is, on Exhibit M?

A. The rocker is reasonably free to move but has a considerable amount of inertia because of its weight. The tappet is even freer to move, and has less inertia.

Q. Comparing that with the Marschalk device Exhibit E, isn't it obvious that the rocker in that model has a great deal more inertia than the rocker in Exhibit M?

A. It looks like it would have, although judging from here I don't know. This feels like it might be made of aluminum. Is that made of aluminum? This feels like it might be made of steel.

Q. If you want to I can find out.

Mr. Leishman: I don't remember. That was made a long time ago. It might be aluminum.

The Witness: I don't think I can testify that it is as heavy or heavier than this one. Yes, I am quite convinced that is lighter. It is probably aluminum or duralumin, and this one is probably steel.

Mr. Flam: I think when he said "aluminum" or "duralumin" the witness referred to Exhibit E. Is that right?

The Witness: Yes.

Mr. Flam: And when you referred to steel you referred to Exhibit M? [427]

The Witness: Yes, Exhibit M.

(Testimony of Bertram A. Schwarz.)

Q. (By Mr. Flam): Prior to December 15, 1934, do you know of any automatic tuner in which a freely pivoted member pressed upon opposite sides of the axis of another rotatable member at the same time while the rotational axis of these members were in line?

Mr. Lyon: I object to that as not cross-examination.

The Court: What are you reading from, the patent?

Mr. Flam: No, your Honor.

The Court: Objection sustained.

Mr. Flam: That date, your Honor, was the date when the original application finally resulting in the patent in suit was filed, and that is the significance of the December 15, 1934, date.

The Court: I didn't know what that was. Repropound the question with that statement.

Q. (By Mr. Flam): Prior to December 15, 1934, do you know of any kind of a device in any automatic tuner in which a freely pivoted member pressed upon opposite sides of the axis of another rotatable member at the same time while the rotational axes of these members were in line?

Mr. Lyon: I object to that on the ground it is not cross-examination. This witness was put on to describe certain structures and certain things. He wasn't put on to describe what was in the prior art in general. [428]

(Testimony of Bertram A. Schwarz.)

The Court: I think so. I think the ruling was correct before. It will be sustained.

We will hear the rest at 2:00 o'clock.

(Whereupon at 12:00 o'clock noon, a recess was taken until 2:00 o'clock p.m. of the same day.) [429]

Wednesday, June 2, 1948, 2:00 P.M.

The Court: Proceed, gentlemen.

BERTRAM A. SCHWARZ

called as a witness by the plaintiff, having been previously sworn, resumed the stand and testified further as follows:

Cross-Examination

(Continued)

By Mr. Flam:

Q. In this Exhibit M you notice there is a rocker and a tappet, and when you bring the rocker and tappet together the axis of the rocker and tappet are coaxial? A. Yes.

Q. When I brought these two parts together, the tappet was freely moved and it engaged opposite sides of the rocker. When did you first learn of an automatic tuning device that employed that combination of tappet and rocker which when freely pivoted—in which the tappet when freely pivoted could be brought into coaxial position with the rocker?

(Testimony of Bertram A. Schwarz.)

A. I don't believe I could mention a specific date. We laid out tuners of that sort, and in the process of laying it out came to that conclusion.

Q. When was that?

A. We worked on tuners of that kind as far back as 1937 or '38, between—somewhere between '37 and '38, laid them out, and we built samples and studied the requirements [430] of those tuners.

Q. Was that the first time you ever heard of any device in which there was a freely pivoted rocker and a freely pivoted tappet that would become coaxial when they were brought into engagement, the tappet pressing on opposite sides of the rocker?

A. I can't testify to ever becoming greatly conscious of coaxiality. I worked on the rack tuner, and we decided where we would put the axis on that relative to the rack steps, and when we tried rockers, we decided after trial where to put the axis relative to the treadle bar. And I can't remember just becoming exactly conscious that it should or shouldn't be coaxial.

Q. That was no earlier than 1937, is that right?

A. In the years 1937 and perhaps early 1938 most of this work was done, including studies of this type of tuner mechanism.

Q. I think you spoke of coaxiality on your direct examination as a principle. Isn't it rather a relationship between parts?

A. I am not clear as to the difference of defi-

(Testimony of Bertram A. Schwarz.)

nition there. It is a relationship between parts, and therefore I would have called it a principle.

Q. That is, in your mind the principle in that case is the same as the relationship between parts, is that right? [431]

A. The principle being the relationship between parts is the way I had intended it. The relationship of the two axes.

Q. That is, when there is more than one axis, and they come into alignment, then the relationship between the two axes is that which might be termed coaxiality, is that right?

A. Yes, I believe that is the definition.

Q. You stated you had known about making things coaxial ever since you studied mechanical design and mechanical engineering at school. Did you ever make the axis of one member coaxial with another separate member to keep them from rotating with respect to each other, or to keep them from rotating at all?

A. I don't think I got all of that question. Will you please repeat it?

Q. Did you ever make any two members coaxial for the purpose of stopping all rotation whatever?

A. Relative movement?

Q. No. I mean all positive movement.

The Court: I don't understand that question, Mr. Flam, myself. Maybe he does. And I am sure you do, because you have asked it. I don't.

Q. (By Mr. Flam): The purpose of the coaxial

(Testimony of Bertram A. Schwarz.)

principle in the Leishman device, as we understand it, is that when the two axes become coaxial there is no rotation whatever of [432] the rocker.

The Court: I see.

The Witness: I think I could testify to that, after hearing what you mean, since there is no movement on them, then the two I would expect would not have any tendency to rotate.

Q. (By Mr. Flam): Will you answer whether you have ever made parts coaxial in order to prevent movement of one of the parts?

A. I cannot think at this moment of an instance.

Q. Can you think of any example of one in which movement of both parts is prevented after they have become coaxial?

Mr. Lyon: It doesn't seem to me, your Honor, that these questions are pertinent, because the witness hasn't subscribed to the theory that that is the purpose of aligning these axes in this device.

Mr. Flam: He did testify about examples of coaxiality and what they were used for.

Mr. Lyon: I think he has testified that the purpose was to avoid moments. I don't think he has subscribed to these questions at all. I think there should be a foundation laid for them. I haven't any objection to your interrogating him, but the questions are going to be very confusing and the answers are going to be very confusing in the record. [433]

(Testimony of Bertram A. Schwarz.)

The Court: Objection overruled.

The Witness: May I hear the question again?

(The question referred to was read by the reporter as follows: "Can you think of any example of one in which movement of both parts is prevented after they have become coaxial?")

The Court: Movement of both parts?

Mr. Flam: Yes.

A. I am sorry, I can't at this moment.

Q. (By Mr. Flam): Then, so far as you know, this arrangement shown in the Leishman patent and as exemplified in these exhibits is unique, you haven't been able to find anything prior to 1937 like it, is that right?

A. I haven't testified to the fact that I have seen this device presented to me as coaxiality. I don't believe that I could say that as of 1937 or 1938 or 1939 was the beginning of seeing this device as a unique one.

Q. Prior to 1937 you saw no device, then, in which the principle or relationship of the parts utilized coaxiality to prevent any movement of one or both of the parts that become coaxial?

A. I cannot think of an instance at this moment.

Q. You have testified about these Schaffer models, such as Exhibit I, haven't you?

A. Yes, I have. [434]

(Testimony of Bertram A. Schwarz.)

Q. And also Exhibit H. Those are lever-operated devices in which a tappet is utilized? Do you see that? A. Yes.

Q. Are you familiar with that?

A. Yes, I think I am.

Q. Applying the lock of Schaffer to that tappet and turning the screw on the lever, would that form an entirely adequate and satisfactory lock for the tappet? I am just talking about the lock, not about the operation.

A. I wanted to see what sort of lock it was, and this is a very brief examination. I can see that it binds across a bigger diameter there and would be considered to be—it would have fair effectiveness because of the increase of diameter there for the increase of moment arm of the locking device relative to the hub as compared with other devices that I have testified to. I would not be able to state the effectiveness of that without tests of this particular model and this particular sample.

Q. Can you do it with this Exhibit H?

The Court: That is the same Schaffer complete.

Q. (By Mr. Flam): Why can't you test the adequacy of the lock in these devices?

A. I think you would have to have equipment to do that for angular rotation, to see whether it would turn a shaft here or move from the shaft.

Q. Does the lock place a torque on the shaft in any way? What has the rotation of the shaft got to do with the lock? That is what I am getting at.

(Testimony of Bertram A. Schwarz.)

A. I mean by that after it is locked up whether it would return to the given point. I would have to have an indicator on here, know the load, and go through the measurements, which I haven't done.

Q. You testified that these Zenith Schaffer models were entirely satisfactory in use and could be used very efficiently for automatic tuning, didn't you? Or did I misunderstand you?

A. My understanding of the testimony was that a Schaffer tuner, I know of no reason why it couldn't be made or isn't as satisfactory for automobile, and so on. I think I testified that we took the tuner and adapted it for automobile use and it was quite satisfactory in that respect. And I don't think we changed the lock-up too seriously on it.

Q. You use the same type of lock on your Exhibit 3, Plaintiff's Exhibit 3, as you do on the Schaffer, is that what you mean?

A. We come across the outside of a tappet that is very similar to this one, and it has about the same rotational point, and it is a very effective lock. And from looking and examining this model it looks as though it has the same kind of lock, and therefore I think this lock would be [436] comparable to that lock in efficacy.

Q. Since the lock on your Exhibit 3 is entirely satisfactory, then you mean to say that the lock on the Schaffer device would be?

(Testimony of Bertram A. Schwarz.)

A. That is the conclusion I would arrive at. That was the reason for the conclusion.

Q. Would there be any difficulty in using the same kind of lock for the tappet as is used in Schaffer upon the Leishman device, such as shown in Exhibit M, if you wanted to?

A. That would be another step removed and it would call for still more conjecture.

Q. Couldn't you immediately substitute the type of lock illustrated by Schaffer in Exhibit M?

A. No, for several reasons that I believe I testified to. One is that angle of this tuner is so small that the loads due to the inefficiency of this tuner as compared to a 180-degree tuner requires a much better lock here than here (indicating).

Mr. Lyon: You had better identify which is "here" and which is "here."

The Witness: I beg your pardon. The lock on Exhibit M would be required to be better than the lock on Exhibit I or the lock on Plaintiff's Exhibit 3, or the lock on Exhibit H, because tuner M has a short angle of rotation, and therefore [437] has an unfavorable pressure, an increase in the load and the work it must do, and therefore I would expect the lock has to be more effective and efficient than the lock on these other tuners, that is, tuners similar to I. Furthermore, the diameter of the hub held by the lock, as I believe I have testified to, is limited, otherwise the rocker would have to increase in size, and if it increases in size

(Testimony of Bertram A. Schwarz.)

that further restricts the movement unless the lever becomes large, so we get into a lot of conjecture as to the size, and as to the angle of movement, and as to the pressures required; but in general I would expect that a better lock is needed on this type of tuner, that is, tuner M, than on tuner I. [438]

Q. Well, I don't think I quite understand the reason why a better lock would be needed. Would more force have to be exerted upon the Leishman type of device than the Schaefer devices or in plaintiff's Exhibit 3?

A. Either more force or more push button stroke the more work occurs at the tappet.

Q. And why is more work needed at the tappet?

A. Because more multiplication is needed to drive the 180-degree condenser with a 25 to 38-degree tuner, and we have found that was true even with a 60 to 80-degree tuner, where between 60 and 80 is a more optimum load than this type of tuner even that requires special care in the design of a lock-up—greater care than in the rack type of tuner.

Q. And to whom is entrusted the design of the lock-up?

A. Mechanical engineers.

Q. They are skilled workers in the art?

A. Skilled workers in the art, yes.

Q. And you had no difficulty in designing these extra special locks that were needed to prevent movement of the tappet, is that right?

A. It depends upon the degree of the problem.

(Testimony of Bertram A. Schwarz.)

The end result would be difficult to forecast or how satisfactory the end result would be would be hard to say until all of those—until we had gone through all the steps and they had [439] gone through all the steps to actually do it.

Q. Now, if the rocker in the Leishman device would permit a movement of 60 degrees between extreme positions would the same problems arise?

A. It would help it considerably, but as I think I testified, even an optimum of these which I think in our experience shows falls somewhere between 60 and 80, the problem is still more intensive but can be solved as has been demonstrated.

Q. Don't you know that as a matter of fact condensers were available ten years ago with less than one inch ounce of torque and this was referred to and marked as zero torque condensers?

A. Yes, but they weren't practical of application. I can testify to the fact that we had to increase the torque for the reasons I gave in my testimony this morning. We had to increase the minimum torque beyond one inch ounce. Otherwise microphonism was a serious problem in selective radio sets or miss-tracking with the vibration and particularly in auto radio.

Q. Well, your answer is that there were low torque condensers available ten years ago, is that right?

Mr. Lyon: I object to that. What does he mean by "available"? The witness testified that they couldn't be used with those torques and I don't

(Testimony of Bertram A. Schwarz.)

think the record should [440] contain an indefinite question so as to confuse the witness' testimony.

Q. (By Mr. Flam): Do you know what I mean when I say "available"? That they could be bought on the market ten years ago with less than one inch ounce of resistance torque?

A. I see what you mean and I couldn't testify yes or no, because I know they weren't usable by us. We never considered them.

Q. Didn't you say sometime in the course of your testimony that the minimum torque available on condensers about ten years ago was about three or three and a half inch ounces?

A. If I did I didn't intend to say that the torque limit—that is the maximum limit of condensers today is about three-inch ounces. Sometimes we have to pick condensers higher than that. And ten years ago it was about four and a half inch ounces maximum and that is to allow for a production tolerance in it by the manufacturer of condensers so that their low limit wouldn't run too low. They have to have a maximum and a minimum.

Q. Don't you know that these relatively low torque condensers were of the type that were always used with coaxial rocker and tappet tuners?

A. No, I couldn't say that. [441]

Q. I show you Defendant's Exhibit HH and ask you whether that condenser has a low or high torque?

(Testimony of Bertram A. Schwarz.)

A. I couldn't tell you without accurate measuring instruments how low or how high it is. It doesn't seem very near the maximum limits that I testified to, but I wouldn't be sure.

Q. And those maximum limits were three and a half inch ounces, is that right?

A. About three-inch ounces now and about four and a half inch ounces ten years ago.

Mr. Flam: I am through with my cross-examination, your Honor.

Redirect Examination

By Mr. Lyon:

Q. Do you have Exhibit M before you?

A. Yes.

Q. I wish you would compare on that exhibit the shape at the bottom of the locking member with the drawing of the reissue patent in suit, Figure 2, the extension of the lever which comes in contact with the hub locking the hub attached to the patent is V-shaped?

A. In Exhibit M, whereas in Figure 2 of the reissue patent, 20827, it is not shown V-shaped and it is shown to be on the hub as a circle.

Q. Now, can you state what [442] effect if any, that difference would have on the effectiveness of the lock in this Exhibit M?

A. Two concentric circles as this is shown, if produced, will have one point of contact whereas a V will have two points of contact and will uti-

(Testimony of Bertram A. Schwarz.)

lize the principle of a tool-maker when he wants to keep a piece from turning he puts it in a V block because the V-block then gives him two points of support and he hits it with the tappet at the third point—in this case the third point being the center and that would minimize rotation of the tappet when it came in contact with a treadle.

Q. In other words, which would be the most effective in locking the structure as shown in this model, Defendant's Exhibit M, or the structure as shown in Figure 2 of the patent—reissue patent drawing?

A. I think that the V-shape as shown on Defendant's Exhibit M would be the more effective.

Q. You have been asked about the operation or effectiveness of this feature of coaxiality in preventing two parts moving in connection with the device of the patent in suit and you have referred to the principle of moments or the elimination of moments. Will you explain just what you mean by that and what a moment is and how the elimination of moments avoids this walking that has been demonstrated here as being avoided by coaxiality?

A. I will endeavor to do so. If the two centers are at a distance from each other the separating distance is considered the lever arm or a moment arm.

When one point of one circle hits the point of its mating circle and the centers are not together—in other words, there is a moment arm difference

(Testimony of Bertram A. Schwarz.)

between centers, then there will be a fight between the two circles as to each one wanting to follow its own path because of the leverage which exists between those two points.

I don't know whether that makes it entirely clear. Let me see if I can elucidate. For example, if we were striking right through the center of a circle with an arm and hitting the exact center of that circle the circle would not be expected to turn because there would be no moment arm, but if we were striking with an arm any point out from that center we have have a moment arm by the distance out from that center and the circle would then move such as a crank and the crank would be the moment arm.

Q. Now, what is the relation between this matter of moments which you have just described and the principle of concentricity or symmetry which you referred to on your direct examination.

The Court: We will take a recess for a few moments.

(Short recess.) [444]

The Court: Proceed, gentlemen.

Mr. Lyon: I believe there was an unanswered question, but the reporter has changed, so I will restate the question.

Q. (By Mr. Lyon): Mr. Schwarz, what does this engineering practice of eliminating moments, that technique, have to do with the fact that in this tuner having an adjustable tappet and rocker

(Testimony of Bertram A. Schwarz.)

with coaxiality there is no walking movement of the operating member as demonstrated to the court here?

A. This application of the old principle of moment arms and how they work and how they function would be in this case to prevent the tappet from jumping around, or, in other words, from moving when it came into relation with the rocker. And that, as I have tried to point out, is application of an old principle to produce a desired result, because without a moment arm the two pieces would either not move, or if actuated would move together.

Q. If the moments were eliminated would their effect be as you have stated, if two members move that they move together, or if one moves the other will move with it?

A. I think one is the converse of the other. In other words, if we consider one a transmitting means, and the other a receiving means, if the one was actually in dynamic movement the other would be expected to move with it if they were concentric. But if the one was not in movement and [445] the other came up against it, it would not be considered to move in any other plane or in any other circle, because of the elimination of moment arms. I think I can explain by a simple example, if I may be permitted to do so, to try to make my explanation a little clearer: If a tool-maker, as I said before, had to drill a hole or prick-

(Testimony of Bertram A. Schwarz.)

punch a bar, he would put it in a "V" block and would be sure to punch it in the dead center of that bar, otherwise the bar would move relative to the V block, and that would be the application of moment arms to movement, if he punched or drilled it in the dead center it would not be expected to move.

Q. Does a toolmaker practice that technique of eliminating moments in the ordinary course of practicing his profession?

A. Yes, he does, when he takes a bar and puts it in a drill press, or if he wants to prick-punch it to drill it he puts it in the V block and then hits or drills it in the dead center right through the center of the bar, and thereby introduces no upsetting moment arms causing no movement of the one relative to the other.

Q. To make the record clear, is it your testimony that this technique of eliminating moments in designing machines or pieces of apparatus is what you referred to as principles of symmetry or concentricity, which you stated were known and expected of machine designers, to your knowledge, ever [446] since you have been in school?

A. That is what I meant when I testified to the symmetry, concentricity and coaxiality, and the laws of it for relative movement or non-movement.

Mr. Lyon: I have no further questions, your Honor.

(Testimony of Bertram A. Schwarz.)

Recross-Examination

By Mr. Flam:

Q. Do you have the patent Exhibit A before you, Mr. Schwarz?

The Court: Do you mean the patent in suit?

Mr. Flam: Yes, your Honor.

The Court: Here is my copy.

Q. (By Mr. Flam): In Figure 2 where there is a dotted line just around the hexagon, do you see that? A. Yes.

Q. Do you notice the point on that dotted line right immediately above—

A. I could not say that is a point, and I would not have interpreted that to be the apex of an angle, because in reading the specifications and in looking at this that might be a circle around the center hub.

Q. Don't you see any difference in the line from this point where the part 68 contacts the circle down around and over to where the circle comes around and contacts a line prolonged from the right-hand side of that projection 68? [447]

A. It is very imperfect dotting, but why wouldn't the dots go around to hit the tappet on here and show where it would leave the circle, and that doesn't show; so that tappet 62, there is no evidence of anything but a circle on it, and therefore this would look like a very poorly drawn, perhaps, circle in three or four of the dots here at the top.

(Testimony of Bertram A. Schwarz.)

Q. Isn't it true that there are several dots there near the center above the hexagon that seem to diverge and come to a point?

A. They are irregular, they are not a very good straight line, nor are they a very good circle. They look more like a circle than anything else, as far as I can see. I couldn't interpret that to be a V.

Q. That part of the circle that you call a circle between the two vertical lines defining part 68 is not a good circle according to your testimony, is that right?

A. It is irregularities in the dash lines.

Q. And those irregularities don't exist in other parts of the circle, do they?

A. Well, here is one here that is a little blurred, for that matter, and here is one out here that is a little blurred, and one up there that is a little blurred. I am not sure how skilled the draftsman was, whether his ink ran, or what it was. It is hard to testify whether it is a good circle or bad circle. I would never have taken [448] it to be anything but a circle.

Mr. Lyon: Mr. Flam, I think you have stipulated that there is nothing in the written specifications here to indicate that the bottom of that leg 68 is formed with a V notch.

Mr. Flam: I don't remember seeing it in the patent, but of course the patent will speak for itself.

Q. (By Mr. Flam): Then in your opinion if it

(Testimony of Bertram A. Schwarz.)

should be in the form of a circle, that is, this lower surface of the clamp, by making it a "V" shape it would improve the clamp considerably?

A. It would be an improvement.

Q. Would it be sufficient to overcome the difficulties we are talking about?

A. I wouldn't be prepared to say that. I would be prepared to say that it was a step in the right direction.

Mr. Flam: That is all.

Mr. Lyon: That is all, Mr. Schwarz.

Mr. Lyon, Jr.: Your Honor, we have one more witness who will not dwell on any of the subject-matter testified to by Mr. Schwarz, but we have prior art to put in.

Dr. Mackeown. [449]

SAMUEL S. MACKEOWN

called as a witness by and on behalf of the plaintiff, having been first duly sworn, was examined and testified as follows:

The Clerk: Your full name, please?

The Witness: Samuel S. Mackeown.

Direct Examination

By Mr. Lyon, Jr.:

Q. Where do you reside, Dr. Mackeown?

A. Pasadena.

Q. What is your age? A. Fifty-two.

Q. What is your occupation?

(Testimony of Samuel S. Mackeown.)

A. I am Professor of Electrical Engineering at the California Institute of Technology.

Q. How long have you been a professor at the California Institute of Technology?

The Court: Just a moment. Mr. Lyon, I can save you a great deal of trouble. I have had Dr. Mackeown testify before me several times.

Mr. Flam: We will stipulate that Dr. Mackeown is qualified in his field.

Q. (By Mr. Lyon, Jr.): I show you patent No. 585,996 to Woodbridge.

Mr. Flam: No. 36 in the book, I believe, your Honor.

The Court: Do you have that, Doctor? [450]

The Witness: Yes, I have that.

Q. (By Mr. Lyon, Jr.): That patent is dated July 6, 1897, is it not? A. It is.

Q. Will you explain to the court by reference to the drawings any shaft positioning mechanism shown in that patent?

A. Yes. This patent is for a cash register in which a shaft is rotated a pre-determined amount by pressing on a key representing a number. That is shown in Fig. 2. The keys show the different numerical values on the finger pieces of the key, and at the other end of those levers are fixed tappets, they can be seen, probably, best in Fig. 1, so that when any particular key, c2 is depressed, a tappet will be forced up into contact with a rocker and position

(Testimony of Samuel S. Mackeown.)

the rocker. The way the rocker is positioned and the way the tappet works probably can be seen best in Fig. 10, and also Fig. 8.

In Fig. 10, the tappet, which is non-adjustable, is indicated as c3, and as it is raised it makes contact with one of the arms marked d2 of the rocker, and rotates the rocker until the other arm marked d2 contacts the tappet, and the rocker is thus rotated through a pre-determined fixed angle. The rocker itself can be seen in Fig. 8. It consists of two bars with an axis running, or shaft running through the center of the rocker. The description of the shaft positioning part of this patent is given in the paragraph on page 1, starting at line 33 and running through to line 64, and also on page 2 between lines 16 and 43; and the device shown in Fig. 10 is described on page 4 at line 126 and running through to line 3 on page 5.

The other parts of this patent have to do with other mechanisms in the cash register, and I don't think are of importance.

Q. Referring to Figs. 8 or 10, which is the shaft which is to be positioned by the rocker?

A. The shaft is the part shown in Fig. 10 as d3, and on the end of it is a sector d4 which contains numbers that are printed on a ticket, so that as the shaft is rotated different numbers are positioned so that they can be printed on the ticket by the cash register.

Q. You stated Fig. 10; I believe you were referring to Fig. 8, were you not?

(Testimony of Samuel S. Mackeown.)

A. It is shown on both Fig. 8 and Fig. 10, shaft d3 is shown on both of them.

Mr. Lyon, Jr.: I should like to offer the Woodbridge patent No. 585,996 in evidence.

The Court: So ordered.

The Clerk: Plaintiff's Exhibit 8 in evidence.

(The document referred to was marked Plaintiff's Exhibit 8, and was received in evidence.)

The Court: It might be better to use the one that is in this volume, if you have no objection.

Mr. Flam: I believe, your Honor, it has already been offered in evidence by the defendant.

The Court: I don't think so.

Mr. Lyon, Jr.: I checked it rather carefully, your Honor. It was referred to by Mr. Leishman, but it was not offered in evidence.

The Court: I think it was discussed by one of the witnesses.

Q. (By Mr. Lyon, Jr.): Dr. Mackeown, I show you patent No. 2,014,358 to Miller, dated September 10, 1935.

The Court: It doesn't seem to be indexed here in this book.

Mr. Lyon, Jr.: I have one here, your Honor.

Q. (By Mr. Lyon, Jr.): Will you please explain, Dr. Mackeown, the shaft positioning mechanism, if any, shown in the Miller patent?

A. Yes. This Miller patent is another cash register mechanism which operates by positioning a

(Testimony of Samuel S. Mackeown.)

shaft through an angle determined by the specific key that is depressed. In Fig. 3, for instance, the cash register levers with the keys on their forward end are shown in Fig. 3; they are pivoted about the shaft 3 and the rocker that is rotated is rotated about the shaft 5 and consists of the shaft 5 with the two legs 7 and 8. Referring to the last page of the drawings, Figures 9, 10, 11 and 12 show the form of the tappets mounted on these different key levers, and how they operate to position the rocker and rotate the shaft 5. Figures 9 and 10 represent the tappet for the key lever used to register the figure 1. In Fig. 9 the key lever is not depressed, and in Fig. 10 it is depressed. What happens in this case is that the surface 12 on the tappet, which Miller calls a cam surface, engages the rod 7 of the rocker, and rotates that rocker and actually the bar 7 rides over the top of the cam surface and down the other side until the bar 8 engages the surface 13 of the tappet, which is called the stop surface of the tappet. [454]

When the rocker engages both the surface 12, and the surface 13, the tappet is positioned. Figures 11 and 12 show the same positioning for a different key and in this case the key is actually the key used to register the figure 9. And Figure 11 shows the tappet and rocker when the key is not depressed and Figure 12 shows the tappet and rocker when the key is depressed.

Of course the key for Figure 9 rotates the shaft

(Testimony of Samuel S. Mackeown.)

through a different angle than the key for Figure 1.

In this device there are two apertures in the rocker between the leg 7 and the shaft 5, and between the leg 8 and the shaft 5. And portions of the tappet project into this aperture when the key is depressed and both legs of the tappet make contact with the rocker.

The operation of the shaft-positioning part of this patent is described on page 2, column 1, line 14, under the title "Actuating Means" to page 3, column 1, line 13. The rest of the patent is concerned with other mechanisms in the cash register with which I think we are not concerned.

Mr. Lyon: I offer the Miller patent No. 2,014,358 in evidence.

The Court: It will be received and marked.

The Clerk: Plaintiff's Exhibit 9 in evidence.

(The document referred to was marked as Plaintiff's Exhibit 9, and was received in evidence.)

Q. (By Mr. Lyon, Jr.): I will show you patent No. 1930192 issued to Cunningham, dated October 10, 1933, and ask you if you are familiar with that patent?

A. Yes, I am familiar with the Cunningham patent.

Q. Will you please explain the shaft positioning mechanism, if any, in the Cunningham patent?

A. Yes. This Cunningham patent is a device for determining the amount of carbon dioxide in

(Testimony of Samuel S. Mackeown.)

flue gas so that automatic determination of the carbon dioxide can be used to record or control the combustion, say in a furnace.

The gases, if we look at Figure 1, the gas enters the device in a measured quantity through the chamber marked 30, flows through the tank marked 10 at the bottom where the carbon dioxide is absorbed by potassium hydroxide or potash solution, and then enters the chamber marked 15.

The height of the float in chamber 15, which is marked 38, is, of course, then determined by the amount of carbon dioxide which was absorbed and this positions the rod, 40. The position of this rod, 40, must be transmitted then to devices for recording the amount of carbon dioxide absorbed and that is done by a shaft positioning element that can be seen on the last sheet in Figures 5, 6, 7, 8 and 9.

If we look at Figure 8 we can see the rod, 40, which is the same rod marked 40 in Figure 1, and the way the shaft positioning element operates can be seen from [456] Figures 5, 6 and 7.

What actually happens is that the push rod 45, is moved upwardly which releases the hammer, 43, to make contact with the disc, 41, on top of the rod 40, so that the position of this hammer, 43, is determined by the height of this rod, 40, which is to be registered.

The hammer, 43, is rigidly connected.

The hammer, 43, is rigidly connected to the wheel 55, and which has the two pins, marked in

(Testimony of Samuel S. Mackeown.)

Figure 5, so that the position of this wheel or tappet is positioned by the position of the hammer 43.

As the rod, 45, moves further upwardly it causes the lever, 51, to move counter-clockwise and that locks the tappet into position determined by the height of the rod 40.

Further movement upwardly of the rod 45, moves the lever 51 further downwardly, bringing the tappet marked 56 into contact with the rocker which is marked 57. This can be seen possibly best in Figure 9. So, the tappet 56 positions the rocker 57 and thus positions the shaft 58 on which the rocker is attached.

When the tappet is in engagement with the rocker the apparatus is so designed that the axis of the tappet and the axis of the rocker lie in the same line. This is shown in Figure 7 which is a drawing of the apparatus. [457]

When the tappet has engaged the rocker and moved it into its final position in Figure 7, it can be seen that both legs of the tappet are in engagement with both arms of the rocker and also that the center of the shaft, 58, on which the rocker is mounted and the shaft on which the tappet is mounted, coincide and do have a coaxiality.

Mr. Lyon: I offer the Cunningham patent, 19330192 in evidence. .

The Court: So received and marked.

The Clerk: Plaintiff's Exhibit 10 in evidence.

(Testimony of Samuel S. Mackeown.)

(The document referred to was marked as Plaintiff's Exhibit 10, and was received in evidence.)

The Witness: I might add for the convenience of the court, that the shaft positioning mechanism in this Cunningham patent 1930192 is described on page 2 from lines 54 to lines 112.

The rest of the patent—most of the rest of the patent is concerned with the gas measuring equipment that I don't think is important in this case.

Mr. Flam: I would like to see that model if you are going to exhibit it to the witness.

(Device handed to Mr. Flam.)

Q. (By Mr. Lyon, Jr.): I show you a device which I ask that you compare with the Cunningham disclosure.

A. This device is very similar to the [458] shaft-positioning device shown in the Cunningham patent and particularly as shown in Figure 9 of the patent.

The device has the lever which is marked 50, and also another lever which is marked 51. It has the tappet which is the wheel, 55, with the two pins marked 56, which form the arms of the tappet and it has the shaft 56, on which is mounted a triangularly shaped rocker shown as 57.

Comparing this figure 9—comparing it with Figure 9, the hammer consisting of the shaft 44, and the bolt 43, are not present and have been removed and connected to the shaft 58 is a section of a

(Testimony of Samuel S. Mackeown.)

gear which is in mesh with the ordinary tuning condenser of a radio.

In the patent shaft 58 is shown as connected in Figure 2, to a pen for making an ink record of the amount of gas present—amount of carbon dioxide gas present in the flue gas in Figure 3, as connected to an electrical device and circuit, in this case it is a resistance, so that the amount of carbon dioxide gas can be recorded at a distance from the instrument. And in Figure 4 as making electrical contact for controlling automatically the amount of air fed to the furnace to give correct combustion.

Q. (By Mr. Lyon): Taking the device which I have shown you, is that device capable of positioning the shaft which you have pointed out as 58 in the patent and consequently [459] the condensers? A. Yes.

Q. Will you show the court how that is done?

A. This device can be used for turning the condenser to any desired angle to bring in any radio station.

To set this device in the beginning the lever containing the tappet can be moved down to bring the tappet into engagement with the rocker. The condenser then can be positioned manually to any desired position. The brake then can be applied and then if that condenser is turned to any other position and the tappet is moved downwardly with the brake applied, the condenser will be brought back to that pre-determined position.

(Testimony of Samuel S. Mackeown.)

Q. Is that operation the operation which has been discussed here in connection with these various rocker and tappet tuners?

A. Yes, this is a tappet which is brought down to engage a rocker and thus positions the shaft on which the rocker is mounted.

Q. Now, in the devices you show it when the tappet is brought into engagement with the rocker and the rocker then tuned to a particular station, is there present any movement of the lever which carries the tappet?

A. No. The lever is held down into position—it is held in the position shown in Figure 7 of the Cunningham [460] patent and the tappet is in engagement with both arms of the rocker. The axis of the rocker is coaxial with the axis of the tappet and there is a balance of all movements and there is no tendency at all for the lever to move as the rocker is rotated.

Q. When you say there is no tendency for the lever to move do you mean there is no walking in the sense that we have used the term in this trial?

A. Yes. There would be no walking as it has been used in this trial.

Q. Are you familiar with Plaintiff's Exhibit 2 in this case, the letter to the trade describing the test for coaxiality?

A. I have read that letter some time ago. I haven't read it very recently.

Q. Will you read it over, particularly the second page?

(Testimony of Samuel S. Mackeown.)

A. I have just read the first two paragraphs on page 2 of this letter, Exhibit 2, and I am familiar with what that test is.

Q. Now, does this, referring to the contents of that letter, does this tuner perform in such a way as to indicate as to pass the test as it were?

A. You are referring to this model in front of me, Mr. Lyon? [461]

Q. The model which we are discussing.

A. Yes. If the tappet is brought into contact with the rocker and the brake or lock is free so that the rocker can move, if the rocker moves or is moved by hand, there is no tendency for the lever supporting the tappet to move or walk.

Q. Dr. Mackeown, are you familiar with Defendant's Exhibit E, the so-called Marschalk model?

A. Yes, I am, Mr. Lyon.

Q. Did you see the demonstration which Mr. Leishman made in his direct testimony as to the adjustment of that model, Exhibit E?

A. Yes.

Q. Can you perform that operation on the device which we have just been discussing? A. Yes.

The Court: You had better refer to it, Mr. Lyon, by exhibit number.

Mr. Lyon: I think we should have it marked for identification, your Honor. I offer this for identification.

The Court: It may be marked.

(Testimony of Samuel S. Mackeown.)

The Clerk: Plaintiff's Exhibit 11 for identification.

(The document referred to was marked Plaintiff's Exhibit 11 for identification.) [462]

The Witness: As I recall, the test you are referring to, Mr. Lyon, is the test made on Exhibit C in which if the tappet is loosened so that it may rotate on the lever which carries it, and that is brought down into contact with the rocker, there is a tendency of the rocker to rotate.

Q. (By Mr. Lyon, Jr.): That's correct. I should like for you to perform for the court the same operation, but using Exhibit 11, for identification.

A. In Exhibit 11 the same demonstration can be made, the position of the rocker can be seen by looking at the leaves of the condenser, because the rocker is attached to that shaft, and if the lever carrying the tappet is moved downwardly, while the tappet is free to rotate, there is no tendency of the rocker, or the condenser, to move.

Q. When you say "no tendency to move," do you mean no tendency to de-tune the condenser?

A. No tendency to de-tune the condenser. I have just demonstrated that on Exhibit 11.

Q. Will you explain now what there is in Exhibit 11 that causes that lack of de-tuning or avoids it?

A. Yes, that is because there is no unbalance of moments about the shaft bearing the rocker, and

(Testimony of Samuel S. Mackeown.)

that is because the shaft bearing the rocker and the shaft bearing the tappet are coaxial.

Q. Dr. Mackeown, in that Exhibit 11, for identification, [463] is that device as you have demonstrated it a device in which when the tappet and rocker—the tappets and rockers are engaged, the tappet may be freely pivoted?

A. The tappet may be freely pivoted provided the lock is not applied.

Q. I understand that. When the tappet in Exhibit 11, as you have demonstrated it, is brought into engagement with the rocker, is there any tendency for the portions of the tappet which meet portions of the rocker to de-tune the rocker by virtue of a lever arm or a moment arm?

A. No, there is no unbalance of moments, so there is no tendency to de-tune. I demonstrated that just a few minutes ago.

Q. Deducing from your testimony, the coaxiality balances up the moments, am I correct?

A. Yes, it is because of coaxiality that the moments are balanced.

Q. Still referring to the Exhibit 11, for identification, device, does that device include a rotatable rocker having two arms which are lying on either side of the axis of the rocker?

A. Yes, those two arms can be seen in either Fig. 5, 6, 7, or 9, and the rocker with the two arms is marked 57.

Q. Does the device have a manually movable operating member? [464]

(Testimony of Samuel S. Mackeown.)

Mr. Flam: If your Honor please, this line of questioning apparently is for the purpose of leading the witness so that he may identify parts of the apparatus corresponding to parts in the claim. I think they are a little too leading for that purpose.

Mr. Lyon, Jr.: Your Honor, the purpose of the questions is only for the witness to aid the court in identifying certain devices which may or may not be in the device. It seems to me that the questions are purely factual and the answers yes or no, depending upon whether those mechanical parts are or are not present in the device.

The Court: The objection is made to the form of the question, Mr. Lyon: Anything that brings out the features that it is asserted or contended illustrate the prior art is proper. But it isn't proper even on the narration of what is claimed to be prior art to put the words in the witness' mouth. I don't think it would take any effect on this witness, but I think we ought to avoid leading questions as much as possible. Otherwise the advocate would be doing the testifying, and I think it is a little better to have the witnesses do that, although that is a rather difficult matter in patent cases, I apprehend.

Mr. Lyon, Jr.: What I am endeavoring to do, your Honor, is to have him tell us whether or not there are certain mechanical parts in that device. That is the only purpose [465] of it.

The Court: I think I understand what you are

(Testimony of Samuel S. Mackeown.)

trying to do, and I understand what the witness is doing. This coaxiality feature is an important feature in the case. I think if you direct your questions to him directly, instead of in the manner in which you have, I think you will avoid the force of the objection, and probably save time, too. We want to save as much time as we can in justice to the importance of the problem.

Q. (By Mr. Lyon, Jr.): Dr. Mackeown, will you point out a rocker, if any, on the device?

Mr. Flam: Same objection as before. I don't think it is proper to lead him to point out these various elements by asking him in that manner.

The Court: I don't see how else he could be asked, except to take up the patent as he has already and discuss it. If there be any verbiage in the specifications, he can pursue the same method he did on two other patents here and point it out.

Mr. Lyon, Jr.: I think Dr. Mackeown has quite adequately described the device which he has compared to the Cunningham patent, and the operation of which it is capable. I don't think it is necessary to pursue that line of identifying parts any longer, so I offer Exhibit 11, for identification, in evidence.

Mr. Flam: If your Honor please, I would like to register an objection and point out that this Cunningham device does not show—the Cunningham patent does not show any tuning device. And, furthermore, as has been often demonstrated to your Honor, the tuners, all of these tuners—and I

(Testimony of Samuel S. Mackeown.)

don't have to pick up any one of them—used the position of the rocker to determine the position of the tappet, so that when you adjust the set in tune with a certain station the rocker assumes a definite position. Then you use that position, or try to, to position the tappet, and then you tighten the tappet in that position. In the Cunningham patent I think Dr. Mackeown has quite correctly described its operation. The position of the rocker doesn't have a thing to do with the positioning of the tappet.

The position of the rocker—rather, the position of the tappet is effected by the position of a float. And after it is positioned, then a pin or some other thing is moved by the engagement of the tappet with the rocker.

In view of that, this is entirely non-analogous to the field that we are working in, and it is entirely improper to urge this combination of Cunningham with a condenser to be properly in the prior art.

The Court: Let me ask Dr. Mackeown a question.

Dr. Mackeown, is there anything in this Cunningham patent 1,930,192 that teaches the use of electricity in [467] connection with it?

The Witness: Yes, your Honor. The shaft 58 which is positioned by the rocker is shown in the Cunningham patent to actuate either an electrical contact, that is shown in Fig. 4, which is on the second sheet, shaft 58 is in effect a switch which can make contact with either of the two elements 69, and give by electrical means automatic control

(Testimony of Samuel S. Mackeown.)

of the combustion. And in Fig. 3 on the shaft 58 is shown a device for changing the electrical constants of a circuit, in this case it is the electrical resistance of a circuit. And the specification describes how, by changing the electrical resistance in this circuit the reading of this device can be transmitted to a distant station and registered there.

The Court: I think I will overrule the objection now. The model is received in evidence.

The Clerk: Plaintiff's Exhibit 11 in evidence.

(The device referred to was marked Plaintiff's Exhibit 11, and was received in evidence.)

Mr. Lyon, Jr.: Your Honor, that concludes my examination of Dr. Mackeown, but we have several exhibits which were attached to the complaint, several documents which were attached to the complaint, and a few other things which I should like to offer in evidence right now, and I think Dr. Mackeown can be of some aid. [468]

Q. (By Mr. Lyon, Jr.): First, Dr. Mackeown, I would direct your attention to Exhibit 3 attached to the complaint, which is identified in the complaint as a copy of the Crosley tuner. Are you familiar, Dr. Mackeown, with that Crosley tuner?

A. Yes, I am.

Q. Was that the tuner which was litigated in the Associated Wholesale Electric case? A. Yes.

Q. Is that drawing a fair representation of that Crosley tuner? A. It is.

(Testimony of Samuel S. Mackeown.)

Mr. Lyon, Jr.: I offer in evidence the drawing of the Crosley tuner attached to the complaint in this action.

The Clerk: The drawing is on one sheet and the description is on the other.

Mr. Lyon, Jr.: That description was meant to be illustrative. If there is no objection by Mr. Flam, why we can offer the whole page.

Mr. Flam: I suppose the purpose of this is to try to show that the device in the Associated Wholesale Electric case is patentwise similar to the devices in this case. If that is the purpose of it, I offer no objection.

Mr. Lyon, Jr.: That is the purpose of it.

The Court: It will be received. [469]

The Clerk: Plaintiff's Exhibit 12 in evidence.

(The document referred to was marked Plaintiff's Exhibit 12, and was received in evidence.)

Q. (By Mr. Lyon, Jr.): The second drawing, I believe, is Exhibit 4 to the complaint, a drawing and some illustrative material on the tuner of the Radio Condenser Company. Are you familiar with the Radio Condenser Company tuner which was the subject of litigation in the case of Radio Condenser Company and General Instrument Corporation v. Leishman? A. Yes.

Q. Is that drawing a fair representation of such tuner? A. Yes, it is.

Mr. Lyon, Jr.: I offer the drawing and the illustrative material in evidence.

(Testimony of Samuel S. Mackeown.)

The Court: It will be so received and marked.

The Clerk: Plaintiff's Exhibit 13 in evidence.

(The document referred to was marked Plaintiff's Exhibit 13, and was received in evidence.)

Q. (By Mr. Lyon, Jr.): The next drawing and descriptive matter is Exhibit 5 attached to the complaint, a similar drawing and illustration of the General Instrument tuner in the same case. Are you familiar with that tuner? A. Yes, I am.

Q. Is that drawing a fair representation thereof? [470] A. Yes, it is.

Mr. Lyon, Jr.: I offer such drawing in evidence.

The Court: So received and marked.

The Clerk: Plaintiff's Exhibit 14 in evidence.

(The document referred to was marked Plaintiff's Exhibit 14, and was received in evidence.)

Mr. Lyon, Jr.: For your Honor's convenience we have here similar drawings and illustrative material which have not been used in this case before, showing exactly the two tuners, I believe Exhibits 7 and 8, that are alleged to be infringements of the Leishman reissue patent. If there is no objection from Mr. Flam I shall offer these in evidence.

Mr. Flam: I don't have an opportunity of carefully going over these drawings, and I assume they are right. If I have copies of these I will offer no objection, but with the privilege of pointing out any error that I may discover.

(Testimony of Samuel S. Mackeown.)

The Court: Of course they will be always received subject to any corrections that are manifestly necessary.

Mr. Flam: I would like to have copies.

Mr. Lyon, Jr.: I offer the drawing of Exhibit 1 to the complaint, which I believe is now Exhibit 6, in evidence.

The Court: Let me understand, Mr. Lyon: That exhibit which you are now characterizing as Exhibit 6, did you say? [471]

Mr. Lyon, Jr.: That, I believe, was filed originally as Exhibit 1 to the complaint, and offered in evidence and received as Exhibit 6. Is that correct, Mr. Clerk?

The Clerk: Exhibit 6 is a tuner with the name Chevrolet on the dial.

Mr. Lyon: That is the one.

The Court: Then what I want to know is is this a new drawing that isn't already in the record?

Mr. Lyon, Jr.: That is an exact drawing of a device already in evidence. It is merely introduced for your Honor's convenience. There are so many models here.

The Court: I understand it now. No objection, Mr. Flam?

Mr. Flam: No.

The Court: So received and marked.

The Clerk: Plaintiff's Exhibit 15 in evidence.

(The document referred to was marked Plaintiff's Exhibit 15, and was received in evidence.)

(Testimony of Samuel S. Mackeown.)

Mr. Lyon, Jr.: For the same purpose I offer a drawing of Plaintiff's Exhibit 2 to the complaint, now Plaintiff's Exhibit 7 in evidence.

The Court: So ordered.

The Clerk: Plaintiff's Exhibit 16 in evidence.

(The document referred to was marked Plaintiff's Exhibit 16, and was received in evidence.)

Mr. Lyon, Jr.: In checking through the evidence I find [472] that no copy of the file wrapper to the patent in suit has been offered or received in evidence, no certified copy of that file wrapper appears to be available, and perhaps Mr. Flam would stipulate to the offering of a photostatic copy of such a file wrapper.

Mr. Flam: That is, without being certified?

Mr. Lyon, Jr.: Yes.

Mr. Flam: I have no objection whatever, except as in connection with all of these things, if there should be any error I should like to point it out.

The Court: That is represented to be a file wrapper of the patent in suit?

Mr. Flam: A photostatic copy of a certified copy. And I don't see any objection to it, unless there is some error that I find.

The Court: We will take a recess of just a few minutes, gentlemen, so that you can look it over.

(A recess was taken.)

The Court: Proceed, gentlemen. Have you looked it over, Mr. Flam?

(Testimony of Samuel S. Mackeown.)

Mr. Flam: Yes.

The Court: No objection to it?

Mr. Flam: No.

The Court: So received.

Mr. Lyon, Jr.: I offer the copy of the file wrapper [473] in evidence.

The Court: Is it a copy or a certified copy?

Mr. Flam: That is just what it looks like.

The Court: Just a copy, not a certified copy?

Mr. Lyon, Jr.: It is a broken up certified copy. The seal has been broken.

The Court: I understand there is no objection to it?

Mr. Flam: No objection.

The Court: So received and marked filed.

The Clerk: Plaintiff's Exhibit 17 in evidence.

(The file wrapper referred to was marked Plaintiff's Exhibit 17, and was received in evidence.)

Mr. Lyon, Jr.: The Schaffer patent has been referred to many, many times in the course of the trial, but it hasn't been introduced in evidence. We shall do so, and unless Mr. Flam objects, why I won't bother to have Dr. Mackeown identify it.

Mr. Flam: No objection. You may as well offer it.

Mr. Lyon, Jr.: Can we stipulate, Mr. Flam, that the Exhibits H and I are embodiments of the Schaffer patent disclosure? Those are the two Zenith devices.

(Testimony of Samuel S. Mackeown.)

Mr. Flam: I think we can.

The Court: So understood.

Mr. Lyon, Jr.: I hereby offer the Schaffer patent in evidence. [474]

The Clerk: Plaintiff's Exhibit 18 in evidence.

The Court: So ordered.

(The document referred to was marked Plaintiff's Exhibit 18, and was received in evidence.)

Mr. Lyon, Jr.: That is all, Dr. Mackeown.

Cross-Examination

By Mr. Flam:

Q. Do you have a copy of the Cunningham patent before you? A. Yes, I have, Mr. Flam.

Q. These pins or projections 56 that you were talking about are the only things that come into contact with member 57, is that right?

A. Yes.

Q. And they are carried by the wheel 55, you said? A. Yes.

Q. I think you mentioned something about the lever 51. Do you see that lever 51? A. I do.

Q. And it has an arcuate surface on its lower side? A. It does.

Q. And that lever is an entirely different lever than the one which supports wheel 55, isn't that right? A. It is. [475]

Q. When the Cunningham apparatus is used the first thing that happens when you push rod 45 upwardly as shown in Figure 6, the wheel 55 is

(Testimony of Samuel S. Mackeown.)

clamped by that arcuate portion on the lever 51, isn't that right?

A. That happens—that is not the first thing that happens.

Q. Well, what is the first thing that happens?

A. The yoke 59 releases the wheel 55, so that what I have called the hammer, consisting of the shaft 44 and the bolt 43, can come in contact with the top of the rod 40. That is when it is used as described in the Cunningham patent for measuring the content of carbon dioxide in flue gas.

Q. Then after the hammer 43 is positioned as shown in Figure 6, the next thing that happens is that the wheel 55 is clamped against rotation, isn't that right? A. That is correct.

Q. And then after it is clamped in rotation then further movement of the lever 50 and 51, causes actuation of the rocker 57? A. Yes.

Q. And by the time the wheel 55 reaches the co-axial position or before that, the wheel is restrained against all rotation, isn't it?

A. That is the method described in measuring flue gas. [476]

Q. And that is what happens with the Cunningham device—what you may term as the equivalent to the tappet is firmly engaged and restrained by the arcuate portion of the lever 51, before it ever gets into contact with the rocker 57, isn't that so?

A. That is true provided it is actuated by the push rod 45.

(Testimony of Samuel S. Mackeown.)

Q. So that the coaxial relationship of the wheel 55 and the rotatable member 57 is not the thing that keeps the wheel from turning, is it?

A. I am afraid I will have to have that question read.

(Question read.)

The Witness: Not if the wheel which is the tappet, is locked. If it is locked, then of course it cannot rotate, but if it is free to move it is the coaxial relationship that prevents movement.

Q. But in Cunningham it never is free to move when it is moved into contact with the rocker, isn't that so?

A. That is so provided it is actuated by the push rod 45.

Q. Now, in Cunningham the wheel 55, has its angular position determined by the position that the hammer, 43, assumes as shown in Figure 6, is that right?

A. That is the way it is described in the patent, yes. [477]

Q. Cunningham never sets his wheel 55, in accordance with the position of the rocker 57, does he?

The Witness: May I have that question again?

(Question read.)

A. Not for the purpose he uses the shaft positioning apparatus described.

Q. Now, in Plaintiff's Exhibit 11 in order to move the tappet so that it will return to the same

(Testimony of Samuel S. Mackeown.)

position, you have to maintain this braking lever in position at all times, isn't that right?

A. Move the tappet so it will come back to the same position?

Q. Yes.

A. Yes. The tappet has to be locked.

Q. And in the Cunningham device as shown by this exhibit, there is nothing to prevent the unlocking of that tappet just as soon as you release your finger from this lever with the arcuate surface, is there?

A. May I have that question again?

(Question read.)

A. You don't have to have the lock applied. You can move downwardly on the lever carrying the tappet until you have engagement between the tappet and the rocker and in that event the lock is not applied to the tappet.

Q. And how would you use this sort of a mechanism for adjusting the tappet for a radio receiving set without anything [478] further being added?

A. By pressing down on the lever carrying the tappet until the tappet is in engagement with the rocker, as I am now doing. Then manually adjusting the tuning condenser to the desired station, applying the lock and then that will always bring the condenser back to that position if the condenser is moved from that position.

Q. As soon as you release the brake then, of course, you can no longer use it for that purpose, can you?

(Testimony of Samuel S. Mackeown.)

A. Well, I think any tuner as soon as you release the tappet, the tappet then is free to move and you cannot tune the station—tune the set to the same station without clamping the tappet.

Q. Then the tappet or the wheel that carries the tappet in Cunningham, is not permanently held to keep its position after one operation, is it?

A. It isn't as shown in the patent. It could be.

Q. That is what I mean. It doesn't show that, does it?

A. It does not show that in the patent.

Mr. Flam: Your Honor, in view of this further explanation by the witness, which shows the lack of adaptability of that model to do anything useful, I renew my objection to the exhibit being received in evidence.

The Court: Well, it may be illustrative of some of the [479] features that are involved in the patent in suit. It isn't very lucid or very inclusive but it may stay in the record in view of the fact we have had so many of these devices and patents, not only in this court but in an Oklahoma court as well. The motion to strike will be denied.

Mr. Lyon, Jr.: I would point out in the Associated case before Judge Harrison that the Cunningham model was introduced not, however, with the condenser but it was pointed out in Judge Harrison's opinion on page 809, in the first column, in Paragraph 11, where Judge Harrison states:

"It is common knowledge that the front wheels

(Testimony of Samuel S. Mackeown.)

of an automobile must both rotate on a common axis. Or in other words, must be coaxial. This relationship is demonstrated in the Cunningham patent."

The Court: But I think this model is a little different from the one that was before Judge Harrison.

Mr. Flam: I don't think there was any, your Honor.

Mr. Lyon, Jr.: The model itself departs from the patent by adding the tuning condenser. Now, it has to be old as we all know——

The Court: We won't argue the case now. I have made my ruling. You may argue the case in your brief.

Q. (By Mr. Flam): Dr. Mackeown, when was that model made, Plaintiff's Exhibit 11? [480]

A. Well, it was made excluding the gear mounted on the shaft, corresponding to shaft 58 of the patent, and the tuning unit. The rest of the metal parts were made prior to the Associated case and this actual model was introduced in the Associated case.

Q. When was the condenser and the gear added to that model?

A. Oh, something about a year ago.

Q. And when the rest of the model was made—that is the part exclusive of the gears and the condensers, that was made after you learned about the Leishman patent in suit, wasn't it? Isn't that the case?

A. Yes.

Q. Who instructed you to have this model made?

(Testimony of Samuel S. Mackeown.)

Mr. Lyon, Jr.: I object to this line of questioning, your Honor. I can't see its materiality to the issues in this case. The device either shows the invention or it does not.

The Court: It may be elucidating to ascertain why it wasn't produced before precisely as it is now.

The Witness: I didn't have this model made up but I did compare the model after it was made with the Figure 9, for instance, of the Cunningham patent.

Q. (By Mr. Flam): You had nothing to do with the model itself? [481]

A. I had nothing to do with the making of the model itself.

Q. Did you give instructions as to what you wanted done in that model? A. No.

Q. Who did, do you know?

A. I don't know. I am thinking now of the original model. I don't know who did, Mr. Flam.

Q. And who gave instructions, do you know, regarding the inclusion of the condenser and the gears? Did you do that?

A. I think that was decided at a conference, which I attended. I don't know as anybody gave definite instructions.

Q. Now, in the Cunningham device isn't it true that there is a casing enclosing the parts mounted on the vertical wall here on the opposite side from that which carries the gears?

A. Yes. There is a casing shown in Figure 1

(Testimony of Samuel S. Mackeown.)

and marked 17, enclosing the shaft-positioning part of the Cunningham device.

Q. And the only part that would be shown in that form, that would be visible in that form, would be the Pen 62 and the chart and the shaft or little piece of the shaft 68? [482]

A. Those are the only parts that project outside of the casing 17.

Q. And they are the only parts that would be visible, is that right?

A. Yes; if you kept the cover on the case.

Q. The model, Exhibit 11, has no hammer or anything like that on it. When was that taken off of the model?

A. Oh, that was taken off a few days ago. It served no purpose in tuning a radio or positioning the tuning condenser of a radio set.

Q. But it was a very important feature of the Cunningham device, was it not, to adjust the wheel in accordance with the float?

A. It was used for the purpose indicated in the Cunningham patent, 1930192, to position the wheel 55.

Q. Wasn't that a very important part of the Cunningham device, to position that wheel?

A. If you use it for measuring flue gas I think it would be, as Cunningham did, but not if you adapt this device for tuning a radio condenser.

Q. Have you ever seen a complete Cunningham device with the tank and the float and so on?

(Testimony of Samuel S. Mackeown.)

A. No, I have not.

Mr. Flam: That is all. [483]

Redirect Examination

By Mr. Lyon, Jr.:

Q. Dr. Mackeown, referring to Model 11. What are the pins 56, as identified in the Cunningham patent mounted on?

A. They are mounted on a wheel marked 55 and form tappets—they are arms of a tappet.

Q. What is that wheel 55 mounted on?

A. That is mounted on a lever.

Q. How is it mounted on a lever?

A. It is mounted on a shaft which goes through the lever. The wheel 55 is mounted on the shaft going through the lever and therefore it moves with the lever.

Q. And what is the relationship between the pins or tappet 56, and that lever?

A. The pins or tappets 56, move with the lever.

Q. Do they move with respect to the lever?

A. No. They can have rotational movement about their shaft but there is no translational movement with respect to the lever.

Q. There is rotation, however, of the pins or tappet 56, with respect to the lever? A. Yes.

Q. Is that right?

A. Yes. The wheel 55 can be moved freely provided the [484] lock does not apply.

Q. Now, Dr. Mackeown, in the operation de-

(Testimony of Samuel S. Mackeown.)

scribed by you with Exhibit 11, is there a push rod 45, involved at all?

A. No. The push rod 45 is not necessary in that manual operation. Push rod 45 is a motor driven operation that is described in the Cunningham patent for automatic operation of the shaft-positioning device.

Q. And it is not used in the operation—the tuning operation described by you? A. No.

Q. In the operation described by you when you positioned the tappet is there any clamping by the upper lever on the tappet carrying the wheel prior to the initial engagement with the rocker?

A. No. There is no locking of the tappet unless the upper lever with the arcuate surface is pressed down against the wheel that gives a lock which can be applied at the operation.

Q. Is that such a lever—is that upper lever pressed down on the wheel while you are setting up the tappet?

A. No. I did not press down on the upper lever and lock the tappet while it was being set. [485]

Q. Now, Mr. Flam referred to a braking device in the Cunningham patent which has a certain function in the operating of the flue gas measuring device. Does that braking device to which Mr. Flam referred have any function in the tuning operation which you demonstrated?

A. Well, it does have the function of providing a lock which can be used to hold the tappet station-

(Testimony of Samuel S. Mackeown.)

ary and immovable so that this device can be used to position a shaft to the same position repeatedly.

Q. Can you point to any means in the prior art or any means which, based upon your experience you consider common, by which you could render the locking of the tappet permanent for the purposes of the tuning which you have demonstrated? By "permanent" I mean as Mr. Flam said "Take your hand away from the levers and then bring it back and retune to the same station."

A. Yes, any device which would clamp the two levers marked 50 and 51 together would make the lock permanent, and a screw device could be used so that the lock could be applied or released at will.

Q. Do you know of any specific instances of that in the prior art before this court?

A. Yes, the Schaffer patent has a locking device, which would be quite suitable. It is similar in a number of ways in that the locking device is applied to a separate lever [486] from that which operates the tappet, and that device could be easily adapted to Exhibit 11 and allow Exhibit 11 to be locked or freed at will. That is, the tappet on Exhibit 11 to be locked or freed at will.

Q. Turning to the Cunningham patent, the last page of the drawings, Figures 5 to 9, is there any casing shown in any of the views, Figures 5 to 9?

A. No, those figures simply show the shaft positioning device itself and are devoid from the equipment for pumping the flue gas through a tank to

(Testimony of Samuel S. Mackeown.)

absorb the carbon dioxide, and there is no casing shown for the shaft positioning device itself.

Mr. Lyon, Jr.: That is all, Doctor.

Mr. Flam: Just a question or two.

Recross-Examination

By Mr. Flam:

Q. Dr. Mackeown, by adding the Schaffer lock to the Cunningham device you would completely defeat the purpose of the Cunningham apparatus, wouldn't you?

A. The Cunningham apparatus includes a shaft positioning device incorporated in more elaborate devices. You certainly do not ruin the shaft positioning device of the Cunningham patent. You would, I think, ruin its operation for measuring the carbon dioxide in the flue gas.

Q. And that is what Cunningham expects to do, isn't [487] that right?

A. That is what Cunningham describes in his patent.

Q. So that, coming back to that question, by adding a lock, permanent lock, such as the Schaffer lock, to the Cunningham lever, it would make it impossible for Cunningham to do the thing for which he has designed his apparatus, isn't that so?

A. For the thing which he describes in his patent. He has more elaborate devices. This is just a part of the device shown in the Cunningham patent, and the whole device is for measuring gas,

(Testimony of Samuel S. Mackeown.)

and it would defeat the purpose of measuring gas.

A. And that is what Cunningham expects to do, isn't that what you said?

A. That is what he describes, let me put it that way. I don't know what he expects to do.

Mr. Flam: That is all.

The Court: I think we will hear the rest in the morning Mr. Lyon—10:00 o'clock.

(Whereupon, at 4:30 o'clock p.m., Wednesday, June 2, 1948, an adjournment was taken until 10:00 o'clock a.m., Thursday, June 3, 1948.) [488]

Los Angeles, California

Thursday, June 3, 1948, 10:00 A.M.

The Court: Ex parte matters?

(No response.)

The Court: Call the calendar.

(Other court matters.)

The Court: Call the case.

The Clerk: 5781-M, General Motors Corporation v. LeRoy J. Leishman, further trial.

The Court: Proceed, gentlemen.

Mr. Lyon, Jr.: Your Honor, I have here a stipulation which provides that the testimony or any part or parts thereof of certain witnesses may be read, received in evidence, and used upon the

trial in this action just as if the witnesses were on the stand and testifying in open court in the above-entitled action.

The Court: Is that correct, Mr. Flam?

Mr. Flam: Yes, your Honor.

Mr. Lyon, Jr.: Pursuant to this stipulation, I offer in evidence the testimony of Charles E. Kilgore as it appears on pages 322 to 326, inclusive, and 341 to 380, inclusive, of the Associated record, and I presume that rather than use the time that it would take to read this testimony into the record, it may be deemed read into the record and the matter given to the reporter for copying into the transcript. [491]

Mr. Flam: Is that all you are offering from that?

Mr. Lyon, Jr.: I shall offer——

Mr. Flam: In general, we may fix that right now. I think, in general, all those that you offer will be stipulated to in that manner, that we will waive the reading with your Honor's permission, and have them included in the record.

The Court: It is so understood and so ordered.

(The matter referred to to be copied into the record appearing on pages 322 to 326, inclusive, and 341, to 380, inclusive, of the record in the case of *LeRoy J. Leishman v. Associated Wholesale Electric Company*, appears in the following words and figures, to wit:)

“And, also,

CHARLES EDMUND KILGOUR

a witness called on behalf of the Defendant, being by me first duly cautioned and sworn, deposes and says, in answer to questions propounded to him by Marston Allen, Esq., of counsel for Defendant, as follows, to wit:

Direct Examination

By Mr. Allen:

Q. Will you please state your name?

A. Charles Edmund Kilgour.

Q. And your age and address?

A. 54. 346 Wood Avenue, Cincinnati, Ohio.

Q. You are connected with The Crosley Corporation?
A. I am.

Q. In what capacity?

A. My title is Chief Research Engineer.

Q. Were you with the company in the year 1937?
A. I was.

Q. In what capacity?

A. Same capacity as at present.

Q. Did you see Mr. LeRoy J. Leishman when he came to the Crosley Corporation in the fall of 1937?
A. Not to speak to him.

Q. Did you have any connection at that time with the conference with Mr. Leishman, or what he wanted with the Company?

A. None, except that after Mr. Leishman had left, Mr. Fred Johnston asked me to send some papers which Mr. Leishman had left with him, to our patent firm, Allen and Allen .

(Deposition of Charles Edmund Kilgour.)

Q. What is this carbon copy of a letter which I show you?

A. This is a letter dated October 4, 1937, which I wrote to accompany the papers which were sent to Allen and Allen.

Q. I ask that the carbon copy of letter be received in evidence and marked Defendant's Exhibit No. 4.

Q. Previous to the time that Mr. Leishman came there, had your company been working on push button tuning for radio [493] receivers?

A. It had.

Q. Who in your company had devised the particular push button tuning device on which you had been working at that time?

A. The idea was first suggested by Mr. Leonard Kellogg.

Q. Mr. Kellogg is now dead, is he not?

A. He is.

Q. Will you please describe briefly the Kellogg device?

A. The device was operated by pushing a button on the front of the receiver. This button moved its shaft longitudinally. The end of the shaft was equipped with a V-shaped member which engaged a pin mounted on a carriage and moved the carriage to a predetermined position dependent on the exact location of the pin on the carriage. The movement of the carriage through mechanism such as a rack served to rotate the rotor of the variable condenser.

(Deposition of Charles Edmund Kilgour.)

Q. Mr. Kilgour, are you familiar with the push button tuning device which is employed in the Crosley receiver 718-C, of which a sample was sent to counsel for Plaintiff in connection with this case?

A. I am.

Q. Do you have here with you a blueprint No. W-45654-D [494] of The Crosley Corporation?

A. I have.

Q. What does that show?

A. This shows a key finger or cam such as is employed in the tuning mechanism incorporated in the receiver model 718-C.

Q. What do the little numbers written at the top of that blueprint mean?

A. According to our drafting system, these numbers should indicate the receiver models in which this particular part is to be used.

Q. State whether or not that would indicate models in which the complete tuning device, including that little finger, such as is in 718-C, would be used?

A. Yes.

Mr. Allen: I ask that the blueprint be received in evidence as Defendant's Exhibit No. 5.

Q. I will show you a list, marked Defendant's Exhibit No. 1 for identification, and ask you what the list shows?

A. This shows the model numbers copied from the top of the blueprint in question.

Mr. Allen: I now introduce Exhibit 1 in evidence.

Q. Now, can you give me, Mr. Kilgour, the

(Deposition of Charles Edmund Kilgour.)

numbers in the 8 series, that is, ending with 8, which also include the tuning device of 718-C but do not happen to be listed on [495] the top of this drawing?

A. Yes. There were a certain number of automobile models, as follows: A-258, A-168, A-268, and a number of changed-over household models, including 1018, 1028, 618 and 818.

Q. Can you produce a copy of the papers that you sent to Allen and Allen with your letter of October 4, 1937, Defendant's Exhibit No. 4?

A. I believe this contract is a copy of the one I sent to Allen & Allen.

Mr. Allen: I should like to introduce the contract in evidence, and ask to have the same marked Defendant's Exhibit No. 6.

Q. Did you have anything to do with the Leishman matter in the fore part of the year 1939?

A. No.

Q. Did you see Mr. Leishman when he came down here in March of 1939?

A. No, as I remember it he did not visit our plant, but only the offices of Allen and Allen. Mr. Tyzzer went down to have a conference with him at those offices.

Mr. Allen: Direct Examination closed.

No Cross-Examination.

And further deponent saith not.

CHARLES EDMUND
KILGOUR." [496]

CHARLES E. KILGOUR

called as a witness on behalf of the defendant, having been first duly sworn, testified as follows:

The Clerk: Will you state your name?

A. Charles E. Kilgour.

Direct Examination

By Mr. Yungblut:

Q. Will you please state your age and residence, Mr. Kilgour, and occupation?

A. 54 years; 346 Wood Avenue, Cincinnati, Ohio; I am a research engineer for the Crosley Corporation of Cincinnati.

Q. Have you been chief research engineer of the Crosley Corporation since prior to 1937?

A. Yes.

Q. Can you state, Mr. Kilgour, when the Crosley automatic tuner, the accused device here, was developed?

A. We started development in 1937 on an automatic push button tuner device and this accused device was the result of that development in the latter part of that year.

Q. Do you remember when you first began to sell radio sets with that tuner on them?

A. In January, 1938.

Q. In the latter part of 1937 and January, 1938, what were your requirements for an automatic tuning device?

A. Of course, like any radio part, we look, first of all, to the cost and simplicity. We also, in a

(Testimony of Charles E. Kilgour.)

small way, make a great many small receivers. Then in the automobile [497] receiver the space available is quite limited. So we were interested in having a device that occupied a small space inside of the receiver and a small amount of space on the panel. In fact, Mr. Crosley had definitely set up the policy that he wanted us to develop a push button type of receiver. He was familiar with the old what we called the cash register type or Zenith type and, of course, other types with the telephone dial; and he thought the thing that would appeal to the public would be just the push button. The American public has more or less of a push button complex. They don't want to do anything more than they have to.

The Court: When did you say you started to develop this? Was it the latter part of 1937?

A. We were working on it most of the year 1937 and it finally came out and was finished up in the latter part of 1937.

Q. (By Mr. Yungblut): What can you say of the accuracy is quite acute. A very small motion of the dial will detune from a station. So the apparatus must be capable of repeating its operation very accurately. Actually, when you get down to the motion of the bar, it is within a very few thousandths of an inch, enough to give trouble.

Q. You stated that cost was one of your criteria. Was there any problem in connection with cost and accuracy in your department? [498]

(Testimony of Charles E. Kilgour.)

A. Of course, they always go together. The type of design we must have is such a design that the parts may be made by simple or low cost mechanical processes, principally those of stampings or press work. And, of course, all these are combined with screw machine parts, springs and things of that kind which, by the very nature of the design, will insure sufficient accuracy, without calling for accurately machined parts.

Q. Are the parts in the Crosley tuners simple stampings, as you say?

A. I believe they are excepting a few screws, springs and so on, that are usually present.

Q. What can you say or have you any information as to the cost of this Crosley tuner?

A. I believe it cost somewhere along about 60 cents, that is, the tuner itself without the condenser.

Q. Now, can you speak as to coaxiality in the Crosley tuner?

A. When the design was finished the experimental design, it was sent to the routine design or drafting department and, without any particular thought or attention being given to the subject, the design was made coaxial.

Q. What do you mean by that?

A. I mean that the nominal dimensions of the drawing show that the axis of the cam, as we call it, or tappet, [499] coincides with the axis of the rocker bar when the two are in engagement; but, of course, in actual commercial production there

(Testimony of Charles E. Kilgour.)

may be considerable misalignment. You see, the rocker bar is mounted on the ends of sort of a frame and the operating members that support the cam slide in slots on the front and back of the frame and there are a good many parts go together to construct the frame. So, that there is a possibility of the addition of ordinary engineering tolerances which might make quite a large inaccuracy in that respect.

Q. When you spoke of drawings, what drawings did you mean, when you spoke of final drawings?

A. Well, when they decide to put an article that has been experimented with in production it is turned over to the drafting department with the idea of the developing engineer and the drafting department, with their mechanical designers, go ahead and lays out the parts and checks their fitting together and so on, and gets the drawings in a condition to turn over to the purchasing department so parts may be bought.

Q. Then, these were drawings for the purchase of what, did you say?

A. Of parts for this tuner.

Q. As I understand you to say, Mr. Kilgour, you would turn over to your drafting or designing department these sketches, perhaps showing the general form of this thing? [500]

A. Yes.

Q. Those sketches, did they show coaxiality?

A. I don't remember that I saw the exact

(Testimony of Charles E. Kilgour.)

sketches that were turned over. I am not sure that they did.

Q. Did they have dimensions on them, for example?

The Court: Do not the sketches speak for themselves?

Q. (By Mr. Yungblut): Have we any of those sketches here? A. No.

Q. We do not?

A. Very frequently with a thing like this the engineer gets an idea and goes out to our model room and talks to the model maker and says, "I want you to make me up a model like this." He makes it up just enough to see that the principle works, and those ideas are turned over to the drafting room, often very informally. The engineer may go into the drafting room and explain to the draftsman just what he has in mind and work with him while it is being developed.

Q. What would you say as to the advisability of getting engineering when you are making a device up from simple stampings, anyway, in which there is not to be any machine work?

A. Well, of course, obviously the more skill you can get into the design the better off you are going to be when you get into the production. [501]

Q. Can you explain that a little more fully?

A. One of the old wisecracks around the engineering department is: "You want to put in a dollar's worth of brains and five cents worth of material." In other words, the more forethought

(Testimony of Charles E. Kilgour.)

and care that can be used in trying to appreciate the problems that will be gotten into, not only in production but in use, of course, the better off you are.

Q. You would say, then, that the Crosley device as laid out on the working drawings had coaxiality as a matter of design, wouldn't you?

Mr. Flam: Just a moment. Isn't that calling for hearsay evidence now?

Mr. Yungblut: Well, one of the drawings, Mr. Flam, is in evidence as part of the depositions. There is one of those working drawings there.

Mr. Flam: I thought this witness was testifying about something that has not actually been identified as yet.

Mr. Yungblut: Would you like to have him re-identify this drawing?

Mr. Flam: Well, I don't care. I don't know which drawing he means, that is all. It seems to me he is talking about some other drawings.

Q. (By Mr. Yungblut): I hand you a drawing marked Defendant's Exhibit 5, Mr. Kilgour, and ask you what that is.

A. That is a drawing of what was called the key [502] finger, referred to in this drawing as a tappet, a push button operated mechanism.

Q. Are there dimensions on that drawing?

A. Yes.

Q. Do those dimensions indicate any particular location of pivot point of the cam with respect to the contacting parts or fingers of the cam?

(Testimony of Charles E. Kilgour.)

A. Yes. They show that this——

Mr. Flam: Just a moment. I don't know whether you have laid a foundation for his testifying about drawings of that kind. I do not know whether he made them or who did make them.

The Court: Isn't he in a position, from stating his official position with the company, to explain a blueprint?

Mr. Flam: Well, all right.

Q. (By Mr. Yungblut): I would like to ask you whether you were familiar with this drawing at the time it was made and with the development with which it was concerned?

A. I was familiar with the development in general and I have seen this drawing many times. I don't recall just when I saw it the first time. Of course, it was made as one of our regular routine drawings and bears the routine date, etc., and went through the drafting room.

I believe there is an unanswered question there.

Mr. Yungblut: Is there, Mr. Reporter? [503]

The Court: When you refer to a date, do you refer to this February 8, 1938?

A. No; that is the rubber stamp of when they make the blueprint from the original tracing.

Q. This shows, then, that this was drawn on September 7, 1938?

A. No; that is a "No. 1." It is not very legible. I have since then examined the original tracing and find that under that "No. 1" there is a fleck

(Testimony of Charles E. Kilgour.)

in the tracing that makes it look like "9," but you will notice that the first change of this drawing, change A, was dated the 8th of February, 1938; so, of course, it must have been drawn before the first change was made.

Q. (By Mr. Yungblut): I would like to ask you, Mr. Kilgour, whether in practice in the actual Crosley device there is coaxiality.

A. I would say there was practical coaxiality but not mathematical or exact coaxiality.

Q. Well, why is that?

A. Well, because of the ordinary commercial tolerances in the various parts will give you some inaccuracies there.

Q. Would you state briefly how those inaccuracies might arise and in what parts?

A. Well, the frame, the part that supports both the [504] rocker bar and the slide members, and in the parts themselves, the frame and the cam and the hole in the slide member—any of those things can get off a little and then that throws the centers off.

Q. Have you found that makes a difference?

A. As far as I know, we have had no difficulty with any of these getting off-center, that is, being off-center has caused no difficulty.

Q. In the Crosley accused device, such as that in Plaintiff's Exhibit 22 or Plaintiff's Exhibit 10, is the plate or rocker attached to a shaft which is connected to the condenser?

(Testimony of Charles E. Kilgour.)

A. No. The shaft is merely a pivoting screw which merely supports the end of the rocker.

Q. What would be an effect of connecting the rocker to a shaft and then connecting that shaft in turn to the condenser?

A. Well, as is more or less obvious, it would probably extend the length of the apparatus slightly to bring the shaft out and put a gear on the shaft; also, to put in additional members which might cause some little back-lash or wind-up that is not present when the sector or gear is connected directly to the rocker bar.

Q. If when the Leishman reissue patent came out in August of 1938, the Crosley Corporation had ceased its [505] manufacture of these devices, what would have been its effect on the corporation and its business?

Mr. Flam: I am not sure whether this man is competent to testify about that.

Q. (By Mr. Yungblut): To your knowledge, Mr. Kilgour?

The Court: Just a moment. Read the question.

(Question read by the reporter.)

The Witness: Shall I answer it?

The Court: Just a moment. I presume this question is asked in support of one of your special defenses pleaded, is it not?

Mr. Yungblut: Yes, and in support of the intervening rights. I want to show what the situation would have been, or rather, the situation in

(Testimony of Charles E. Kilgour.)

which the Crosley Corporation found itself at that time.

The Court: The objection is overruled.

A. Well, August is the time of year when radio production is just getting into full swing for fall and winter markets. Of course, the wholesale market must go a little bit ahead of the retail market. So that the busiest times are often the latter part of August, September and October; and to upset the program at that time would, of course, as anybody can see, have very serious consequences. The tooling is all done, parts are bought, production lines are laid out, advertising already in the magazines or ordered, [506] and perhaps even quite a number of receivers already shipped to jobbers; and the most serious effect, of course, if the program were upset would be the delay in business before a new line could be engineered and tooled up and gotten on the market.

The Court: Any time you have to make a quick change in your production it has a serious effect upon your business; that is what you are trying to say, isn't it, in substance and would have had?

A. It certainly would.

Q. (By Mr. Yungblut): I think you have given me a general answer, Mr. Kilgour. You know that that was true in connection with the particular device as exemplified by Exhibit 10?

A. Oh, yes. That device was used in a larger per cent of our models that season. We had started to ship those models in June and July—May, June

(Testimony of Charles E. Kilgour.)

and July. We had our jobbers' meeting, as we call it, along in May, and the shipments had actually started shortly after that on some of the models; and then, more and more models were getting into production, so that by August we were in full swing.

The Court: May I ask counsel, if the device was an infringement that would not make any difference, would it?

Mr. Yungblut: An infringement of the reissue?

The Court: Assuming that it was an infringement of [507] the original patent, it would not make any difference how much inconvenience was created?

Mr. Yungblut: Not of the original patent; no.

The Court: But it is your claim that the question is directed as to the reissued patent, is it?

Mr. Yungblut: Yes.

Q. When, as you have testified, the final drawings for the purchase of the parts and tools were drawn up and contained this element of coaxiality as a matter of design, did you consider that there was anything inventive about that?

The Court: I did not hear that question.

(Question read by the reporter.)

Mr. Flam: I object to that as calling for a conclusion. I think that the court is supposed to know——

The Court: It is certainly calling for a conclusion and trying to get the so-called expert to——

(Testimony of Charles E. Kilgour.)

Mr. Yungblut: I will change the question, if your Honor please.

The Court: ——tell the court what to do; I am very much in accord with Judge Yankwich's discussion on experts. If you have read that you will limit yourself somewhat.

Mr. Yungblut: I will do so. I will change the question.

Q. Did the company make any attempt to patent the idea of coaxiality? [508]

Mr. Flam: I object to that as irrelevant and immaterial to this issue.

Mr. Yungblut: I think that is a question of fact, if your Honor please, showing what the company thought of it at the time.

The Court: Ask him if there was any application for any patents made on this push-button tuning device.

Mr. Yungblut: I will do so.

Q. Were there any applications for patent made on the Crosley push-button device?

A. Yes.

Q. Was coaxiality claimed in those applications?

The Court: I think that those applications speak for themselves if the patents were issued.

The Witness: They are not.

Mr. Yungblut: They are not issued. They are still pending, if your Honor please.

Mr. Flam: That is one of the applications, I think, that we talked about.

The Court: That is with the interference?

(Testimony of Charles E. Kilgour.)

Mr. Flam: Yes.

Q. (By Mr. Yungblut): As to the application to which you have referred, does that application show coaxiality? I will call your attention to the Howard J. Tyzzer application, Serial No. 192,258, marked for identification as [509] Plaintiff's Exhibit 21.

The Court: May I ask counsel, for my information, is this the only application made, this one set forth in this?

Mr. Yungblut: No. There were several others.

The Court: Several?

Mr. Yungblut: Yes. None of them showed coaxiality, as a matter of fact.

Mr. Flam: I do not know how far your Honor would like to go on that with this type of testimony. I do not think it is going to be of much value one way or the other.

The Court: Well, the only thing is, it looks to me—I want to find out how consistent the defendants are here. They claim that your patent is invalid and then they turn around, make an application for a patent for the same thing. I am rather interested to see.

Mr. Yungblut: As a statement of counsel, if your Honor please, there were other applications, none of them relating to coaxiality.

A. The drawings show in this particular application several types of operating members which work on the rocker bar. One type is the so-called

(Testimony of Charles E. Kilgour.)

tappet type, but the tappet shown is not of the coaxial type.

The Court: You have not claimed the rocker bar and tappet device is patentable, have you?

A. Some of the combinations of the apparatus.

Q. (By Mr. Yungblut): That application and the others [510] you remember, weren't they on push buttons?

Mr. Flam: Just a moment. I object to asking about applications that are not here. The applications speak for themselves.

The Court: I think your objection is well taken. Objection sustained. If you are going to refer to any other application, why, the court would like to see them. It would be very much interested in them.

Mr. Yungblut: Yes.

The Court: Because you have made a claim here of invalidity.

Mr. Yungblut: Yes.

Q. Isn't this but an application on features of the push-button mechanism?

Mr. Flam: Will you read that? I can hardly hear.

(Question read by the reporter.)

Mr. Flam: Objected to as leading.

The Court: I think it is trying to sum up something that the court could find out by reading it, perhaps.

A. As I remember this application, with which

(Testimony of Charles E. Kilgour.)

I was familiar at the time, it is on the combination of the push-button mechanism operating a rocker bar, but no mention is made of coaxiality, no claim is made for coaxiality.

Q. (By Mr. Yungblut): Were you familiar, Mr. Kilgour, with the applications that were filed on this device?

A. Yes. At that time one of my duties was to make [511] contact with our patent firm, the Allen & Allen Company on patent matters.

Q. Were any applications drawn or filed claiming the feature of coaxiality? A. No.

The Court: Just a moment now. I am not going to admit that. I think that you are asking this witness to testify to something that is in writing and if you want to get that in evidence, why, you get your applications in.

Mr. Yungblut: I would like to have the witness' answer for the purpose of the record.

The Court: I am not going to admit it, because you know and I know that you can't ask a witness here to testify to the contents of a written document when that written document is available.

Mr. Yungblut: Yes; and I will secure and introduce the patent application.

The Court: Then, if you do it, you have the record before us.

Mr. Yungblut: Of course, that line of proof, if your Honor please, simply went to the point that there were not any such applications.

The Court: All right. You have a method of

(Testimony of Charles E. Kilgour.)

proving it and you know how to prove it without using secondary evidence.

Mr. Yungblut: Very well. [512]

The Court: It is apparent to the court that the reason that you are trying this way is that you do not want your applications to appear for the court to see what you were claiming. Now, that is the attitude that the court takes in the matter, if you are suppressing the contents of your application, without disclosing the full set-up.

Mr. Yungblut: The applications are not here, if your Honor please. They are in Cincinnati.

The Court: I know, but you came here to try this case.

Mr. Yungblut: I will be very glad to introduce them.

Q. I want to ask you one other question, Mr. Kilgour. You spoke of an engineer in drawing up these drawings making the pivots coaxial. What was the position in the company of the man who did that, if you know?

Mr. Flam: Will you read that question? I can hardly hear.

The Court: I would like to have you read it. For some reason or other I can't hear you myself, or it is with difficulty that I can hear you.

Mr. Yungblut: I will speak a little louder.

(Question read by the reporter.)

A. He was one of our design engineers in the radio department.

(Testimony of Charles E. Kilgour.)

Mr. Yungblut: You may cross-examine. [513]

Cross-Examination

Mr. Flam: I think there is a later model of a Crosley mechanism here in evidence.

The Court: There is one that seems to be all ready to connect up. I am curious to try it.

Mr. Flam: I think you have reference to this chassis here. I think I had better introduce the cabinet and the loud speaker in evidence, too, your Honor. This will not be sufficient for trying.

The Court: You would not admit it, would you?

Mr. Flam: Oh, I think it is a good set.

Q. I show you Defendant's Exhibit F. I suppose you know what that is, being chief engineer of Crosley Corporation? That is one of their designs.

A. Let me correct you. Not chief engineer, chief research engineer.

Q. I beg your pardon. A. Yes.

Q. Do you know when that design was first made for the Crosley Corporation?

A. I am afraid I can't give the exact date, but I will say it was some time after the other one, or perhaps—well, perhaps late in 1938.

Q. How late? Was it after August, 1938?

A. Well, I would think so; yes. [514]

Q. You think it was?

A. I know this—I don't remember exactly, because I know the man who worked at this—the only

(Testimony of Charles E. Kilgour.)

substantial difference here is in the push rod we called the skate key type because it operates more or less like a skate key, with a right and left-hand thread; and a man worked up that type of key and it laid around in his desk for a good many months before it was decided to put it into production. And then later on, quite a bit later on, there came the particular application where it seemed to be suitable and it was placed in production. You see, this has the difference you do not lock that cam by the screw; you rotate the position of the cam by turning this screw; so you merely turn the knob on the front of the set to adjust it, push it in and turn this knob and instead of turning your main knob; so it gives you a slightly different type of construction which is somewhat more convenient and somewhat more expensive than the other.

Q. When did it first go on the market?

A. I am sorry I can't remember. I would say somewhere around the last of '38 or the first of '39, and I am not sure about it. That is very inaccurate.

Q. You said that it was developed about the last of 1938. And it went on the market after it was developed?

A. That is when it was developed for commercial development to go on the market. [515]

Q. For what year's set, do you remember? Would it be for the 1939 year or for 1940?

A. It was first used, I would say, in '39, but I

(Testimony of Charles E. Kilgour.)

am not quite—that is only very inaccurate information.

Q. Do you know who the chief engineer was for Crosley Radio Corporation in the summer of 1937?

A. If you will allow me a little explanation of our set-up, we have several engineering departments. We make refrigerators and so on. I suppose the man you are interested in was the chief engineer in charge of radio design?

Q. I will qualify it that way.

A. What was the date you mentioned?

Q. In the summer of 1937.

A. His name was Howard J. Tyzzer.

Q. He was the chief engineer?

A. Of radio design.

Q. Wasn't there a Mr. Johnston or Johnson there?

A. No. No; Mr. Johnston was there in—did you say 1937?

Q. 1937.

A. I beg your pardon. You are correct. Mr. Johnston left the last of '37. And Mr. Tyzzer took over the first of '38 as chief engineer, although Mr. Tyzzer was all that time directly in charge of radio design under Mr. Johnston who had extra duties. He was really chief [516] engineer of the whole plant.

Q. Mr. Johnston you mean? A. Yes.

Q. Under his category would fall not only radio but these other Crosley developments mentioned?

(Testimony of Charles E. Kilgour.)

A. That is right.

Q. Do you know when the Crosley Radio Manufacturing Company first determined to put out a push button tuning device?

A. Well, I think it was very early in '37 or in the winter of '36 Mr. Crosley propounded the problem that he wanted a push button radio receiver.

Q. You have nothing except your recollection about time?

A. That is correct, except I know we started to work, one of our men started experimenting on such a device in the late spring of '37.

Q. How long did the experimentation take?

A. Well, he worked all summer and in the fall we decided to go into production on his device, but it seemed to be a rather difficult one to work out practically; and Mr. Tyzzer got the idea of this other mechanism and we switched over to it and went ahead with it.

Q. In other words, there was a prior development in connection with push button tuners antedating the type that [517] we are talking about here?

A. Yes, sir.

Q. Did that have a treadle bar on it, do you know?

A. No.

Q. You have mentioned Mr. Tyzzer. Is Mr. Tyzzer still engineer, chief engineer in charge of the radio department?

A. No; he is not. He left last June.

Q. Who is the engineer now?

(Testimony of Charles E. Kilgour.)

A. Mr. Clarence Felix, that is, in charge of the radio engineering. Mr. Tyzzer started out here for the first trial and got to Indianapolis and was called back.

Q. You have talked about this application, Plaintiff's Exhibit 21 for identification.

Your Honor, I might offer that now in evidence. I think we have had enough foundation for it now.

The Court: It will be admitted.

Mr. Yungblut: No objection.

Q. (By Mr. Flam): Do you know the contents of that application?

A. Well, I would say I do, without studying it, because we had several, but I may be a little bit confused in my mind after this interval of time.

Q. All I wanted to ask was: Do you know whether or not that application is the one which shows the tuner [518] mechanism such as incorporated in Exhibits 10 and 22?

A. May I see that exhibit?

Q. That file wrapper? A. Yes.

Q. I do not want you to take the time to examine it. Only if you know.

A. I will just look at the drawing. That will be enough. Yes; this shows a drawing or a development very closely equivalent to the commercial article used in these exhibits.

Q. I show you the back cover of August, 1937, Radio Retailing, Plaintiff's Exhibit 6. Does that back cover show anything with which you are familiar? A. The inside back cover?

(Testimony of Charles E. Kilgour.)

Q. The inside back cover.

A. Yes; that shows some radio receivers of our Crosley Corporation.

Q. That is an advertisement of the Crosley line at that period, I presume.

A. That is right.

Q. I call your attention to that circular figure in the lower left-hand corner. What is that? What kind of a mechanism is that, if you know?

A. As it is called in the advertisement, it was a quick tune dial. In other words, it is this type which has [519] been referred to heretofore as the telephone dial type.

Q. Is that the kind of dial that is shown in one or two of the other figures here? I call your attention to what is termed a Fiver Console.

A. Yes; that seems to have the same type of tuner.

Q. Will you explain, if you are familiar with that tuner, how it was supposed to operate?

A. Very roughly, it merely rotated the—it was connected to the condenser mechanism so that if you put your finger in the button marked for a certain station and rotated it down to the bottom where you would hit a stop, it approximately tuned in that station, only very approximately.

Q. I suppose you used what has been termed automatic frequency control circuit in connection with that?

A. I don't remember, but I don't believe an

(Testimony of Charles E. Kilgour.)

automatic frequency control circuit would have been sufficient to correct for the inaccuracies there. You would get it approximately and then you would take hold of the manual control and finish up tuning. It was more or less of a makeshift, I must admit. It was not much of an engineering proposition.

Q. Do you know when the Crosley Corporation developed that telephone dial type of tuner mechanism? [520]

A. Of course, with this magazine in front of me, I would say they had it on the market in 1937.

Q. It was developed before then, of course?

A. It must have been developed some time before this publication.

Q. What is the usual practice, if you know, about these ads? Would ads be inserted in magazines about contemporaneously, or a month or so after a set was developed and ready for market?

A. Of course, advertisements usually must be placed some time ahead of the publication date.

Q. About how far ahead would you say?

A. I am not an advertising man. It depends on the magazine, as I understand it, but a month or so, something of that kind, maybe two months in extreme cases.

Q. That Crosley set shown on that back cover must have been ready to go on the market at least a month before that magazine appeared?

A. I would say the probabilities were it was

(Testimony of Charles E. Kilgour.)

ready for our line, which is usually announced early in the summer of each year.

Q. Early in the summer. By that you would mean—— A. June or July.

Q. You would mean May, June or July?

A. Yes. [521]

Q. In other words, you would have to go back a few months before the ad appeared before the ad would be approved, I suppose?

A. That is right. But sometimes they work very fast—so fast that sometimes ads are wrong. Sometimes changes are made after the ad is ordered, unfortunately.

Q. You said something about the development of this tuner exemplified in Plaintiff's Exhibit 10. I think you said that some sketches were made and then it was developed on a drafting board or something of that sort. Did you develop this?

A. No.

Q. Did you make these sketches? A. No.

Q. Do you know who did?

A. Of course, the actual draftsman who detailed that part, his name or initials appear on there. I don't know whether I would know him from the initials or not. Howard Tyzzer made the original sketches which portrayed the general idea.

Q. Didn't you assist him in the development of that device?

A. My position is one that I do not ordinarily get into the regular developments; but if on some

(Testimony of Charles E. Kilgour.)

problems where the designer feels that two heads are better than one, I am [522] sometimes called in. I remember I was called in particularly on the development of a locking means for this cam in our device.

Q. You were? A. Yes.

Q. What kind of a locking means did Mr. Tyzzer have before you got in on it?

The Court: Gentlemen, I notice the hour, so we will adjourn until 2:00 o'clock.

(Recess until 2:00 o'clock p.m. of this day.)

Afternoon Session

2 o'Clock

(Appearances as last noted.)

The Court: You may proceed, gentlemen.

CHARLES E. KILGOUR

recalled.

Cross-Examination

(Resumed)

By Mr. Flam:

Q. I think we were talking about the locking mechanism on the accused Crosley device when we adjourned, such as shown in Exhibit No. 10, and I think you said that you devised or improved the locking mechanism on this device.

A. I said I got in on some of the work on it. The general form had been devised some time

(Testimony of Charles E. Kilgour.)

before but some difficulties came up and some details and the exact shape [523] and so forth were worked over.

Q. By "were worked over" do you mean that you worked them over?

A. I helped the engineer and the designer who was on that more in the theoretical line. He was worrying about what was involved in such a device, that is, what were the stresses and so forth and what was necessary to improve it, and I tried to work out the theory of it.

Q. Is that Mr. Tyzzer you are talking about?

A. Mr. Tyzzer and one of the draftsmen or engineers. The development was all under Mr. Tyzzer's direction.

Q. Is the form of locking device in Exhibit No. 10 the same as disclosed in this application Plaintiff's Exhibit No. 21?

A. Substantially so; the same general principle.

Q. I mean is the structure the same aside from principle. It is not exactly the same, is it?

A. I would say within the accuracy of a patent drawing it is.

Q. What do you mean by within the accuracy of a patent drawing?

A. A patent drawing shows more or less the general idea, without having mechanical exactness, very frequently.

Q. Was there anything else in connection with this tuner mechanism, Exhibit No. 10, that you had

(Testimony of Charles E. Kilgour.)

anything to [524] do with in the way of development?

A. Not specifically; no. In general, I was familiar with what was going on.

Q. Over how long a period was this process of development of that tuner taking place?

A. I think the first suggestion was made in October, 1937, and the device was actually put on the market in January, 1938, so that the development must have been finished about the end of 1937 at least.

Q. And what it was intended to displace was what we have been calling the telephone dial type, is that right?

A. Not necessarily. The telephone dial type was used commercially just before this but it could hardly be regarded as an equivalent.

Q. I mean that in between the time the Crosley Radio Corporation was marketing the telephone dial type and this type there was no other type of mechanical tuning?

A. No other type on the market; no. The automatic—well, you must remember that, beginning some time back, we had what was called electric tuners which were the push-button type tuner.

Q. I am referring to mechanical tuner.

A. And they continued on to this time and some even later.

Q. I was referring to a mechanical tuner.

A. There was no mechanical type. [525]

(Testimony of Charles E. Kilgour.)

Q. And I assumed you were referring to the mechanical type. I think we understand that now.

A. No; there wasn't.

Q. So that the telephone dial type, you might say, was dropped in favor of the treadle bar type, if I might call it that?

A. I would say so. Our particular telephone dial was never very successful. It would have been dropped anyway.

Q. I think you stated on your direct examination that the parts for the treadle bar type would have to be made to fit close tolerances in order to be accurate. Is that what you meant?

A. I don't believe so.

Q. What was it that you said there in that regard?

A. I don't remember exactly, but the sense of it must have been that we try to make our designs such so that, with parts that could be rather cheaply made, we could obtain the necessary accuracy.

Q. What would be the tolerances that you could tolerate for quantity production in connection with these devices?

A. Well, one of our standard practices on our drawings is to call for tolerances of plus or minus .015; but that may be misleading in some cases because, of course, [526] when a piece is made off the die they may be all just alike; so it is a matter of getting that die accurate enough; and usually it runs much closer than that but as a die wears it

(Testimony of Charles E. Kilgour.)

may change somewhat. We try to make our design to accommodate such things. If you notice—have you Exhibit 10 here? For instance, where the slider bars go through the frame they are held in there by a secondary bar that holds them down and the back—the front this is, where they go through the frame there is a little washer there. When you tighten this screw it pulls that washer down against the edge of the bar and holds it at a certain pressure against the bottom slot; so you do not have to have great accuracy of fit between the width of the slider and the width of the slot.

Q. Would .005 of an inch be too close for manufacturing purposes in the way of tolerances?

A. As I say, that is variable. No. Some parts of it may have to be held closer than others and you would not care if it was 15 or 20; and in this particular case, judging from the variation, I do not believe you have to have extremely close tolerances there.

Q. I notice in your deposition that was taken in Cincinnati the blueprint identified as Defendant's Exhibit 5 shows a series of numbers designating the model numbers of the sets. The prefix "A," does not that mean automobile type? [527]

A. I think it does. I am not sure. In some cases it did; in others it did not. Our system differs.

Q. What is the purpose of the "A" if not to denote automobile type?

(Testimony of Charles E. Kilgour.)

A. We have had various systems and they run out of serial numbers and they put a letter in this case. I think in this case the "A" denoted automotive type.

Q. Automotive type? A. Yes.

Q. I think I understood that the last number, such as "8" or "9" would mean the year 1938 or 1939?

A. That was true at that time; yes.

Q. When Crosley Manufacturing Company gets ready with a radio set to go on the market how long a period is required to make the tools and dies?

A. Oh, that is rather variable. Anybody that has been in the radio business knows it is rather a hectic affair sometimes. Sometimes we have time for ordinary commercial production and other times somebody brings out something we feel we have to meet and we jump into it fast.

Q. When were the tools and dies completed for the push buttons and their associated mechanism of the Exhibit 10?

A. They must have been completed in time to make deliveries of the parts in January or December of 1937 and [528] 1938—not respectively, because we actually sent sets out in about the middle of January.

Q. The tools and dies were all completed at that time? A. They must have been.

Q. When you change——

A. Of course——

Q. Go ahead.

(Testimony of Charles E. Kilgour.)

A. I was going to say that that particular model. Of course, we brought out subsequent models and they did not get into production before the summer.

Q. So far as the parts for the push buttons were concerned you had the same mechanism for all the models, didn't you?

A. So far as the push, that is, the actual individual push rod.

Q. Yes.

A. But so far as the total device; no; because some sets had four buttons, some had six, some had five, and that required different frames and different rocker bars.

Q. Now, when you changed over, for example, from the telephone dial type to the push-button type, you needed a new set of dies to accomplish that, tools and dies, to accomplish that change, as I understood? A. Yes. [529]

Q. Now, when you were going into 1939 production instead of 1938, for example, utilizing the push-button principle, did you have to make new dies for the 1939 models?

A. Well, to some extent probably. Of course, whatever parts, individual parts, could be used are held over; that is, in this case if we used the same push-rod mechanism, of course, tools and dies would still be used in '39. If, for instance, we had a new type of die, which is one of the faddish things on a radio set and is changed quite frequently, we would require a new bracket here to accommodate

(Testimony of Charles E. Kilgour.)

the different types of pointer or what not that we had.

Q. As a matter of fact, every year you had to make a lot of new dies to fit the particular year's production, didn't you? A. That is correct.

Q. I think you mentioned that the cost of a push button was 60 cents?

A. A push-button mechanism.

Q. Mechanism. I just wanted to get——

A. Without the condenser.

Q. I just wanted to get at how much that included. Did that include everything in one individual push button or a bank of push buttons or what?

A. Well, to be frank, my information is not very [530] exact. I wired for that a day ago and got it; and I said I wanted the mechanism without the condenser or knobs.

Mr. Flam: Well, then, I move to strike that part of the testimony.

The Court: What difference does it make if it costs 60 cents or \$60?

A. The answer I got back was 65, and I think that is right. They might have included this panel in some way. You see I did not say to leave the panel off; so there is some doubt there, but it is somewhere under 65 cents.

Mr. Flam: Well, it does not matter, as his Honor says.

Q. In these treadle bar tuners, such as Plain-

(Testimony of Charles E. Kilgour.)

tiff's Exhibit 10, do you know what the angular movement of that treadle bar is supposed to be?

A. I have never checked it exactly but it is my impression—I don't know how accurate it is—it is around 60 degrees.

Q. So there is a 60-degree movement of the treadle bar between its extreme positions?

A. Something like that.

Q. That is what you mean? A. Yes.

Q. And it does not go completely to the——

A. That is right.

Q. It does not make a complete revolution?

A. That is right.

Q. It is very definitely stopped between——

A. It could be very easily calculated by comparing the radii of that gear because this goes to 180. Divide that by 180 degrees by the ratio of these radii.

Q. I did not want anything very accurate. I just wanted the general statement. It is about 60?

A. That's about right.

Q. And I think that is about right. How is the rocker in that mechanism operatively connected to the condenser in the Exhibit 10?

A. There is a mechanism which might be called a sector gear because it is only part of the gear which is riveted directly to the rocker bar or rocker plate, whatever you call it.

Q. The important thing about that transmission mechanism is that it moves the condenser or other

(Testimony of Charles E. Kilgour.)

tuning element in accordance with the movement of the rocker, is that right? A. Correct.

Q. I want to show you the February, 1938, issue of Radio Retailing, again that inside back cover. Is the advertisement carried on that inside back cover an advertisement of the set incorporating these mechanical push buttons? A. It is.

Mr. Flam: I want to offer the back cover of this issue [532] of Radio Retailing, February, 1938, in evidence.

The Court: May I ask the purpose of it? I am trying to follow counsel and I am trying to find out for myself the purpose.

Mr. Flam: I do not believe this witness is going to be put on his guard about this. The purpose back of it is that these ads all show commercial advertisements of this type of mechanism in February, 1938, and already to go; and on the witness' own statement this morning, he said that they must have been already to go, at least a month or so before the ads appeared; and that has a bearing on this question of intervening rights.

The Court: That is on your theory of the law that if they were prepared to manufacture these articles before the reissue——

Mr. Flam: Before the original patent was issued.

The Court: Before the original patent. In other words, I can't state it in the exact language that I want to state it, but I remember you stating it in your pretrial brief.

(Testimony of Charles E. Kilgour.)

Mr. Flam: Yes, your Honor is right.

The Court: Your theory of the law on that question.

Mr. Flam: Yes. That is the basis I am putting this in on. These ads——

The Court: I would like to make inquiry. Your original [533] patent was not issued until after this date, was it?

Mr. Flam: I don't know the exact date of it. I think it was——

The Court: I have it here.

Mr. Flam: February 15, 1938, I am informed.

The Court: What effect does this have, assuming that this evidence is true, that in the latter part of 1937 these people, the Crosley people, developed a push button using a similar device, that is, that you claim is infringing your device?

Mr. Flam: The theory, of course, is my aspect of the theory of intervening rights. Under that theory, if they began the manufacture of a device which becomes an infringement after a patent issues, but they began to manufacture before the original patent issues, then we have a different situation in the case where some one happens to start later.

The Court: What is the legal effect? I may be showing my lack of knowledge. But what is the legal effect of saying, for instance, two people develop a similar device approximately at the same time?

(Testimony of Charles E. Kilgour.)

Mr. Flam: Well, of course, if the Patent Office believes that there is some conflict between the inventors on the question of priority, it goes through a very complicated system.

The Court: We will assume, for instance, that your [534] patent was issued in February, 1938, and that in December, 1939, the defendant developed a device that, according to your contention, infringes your device.

Mr. Flam: I think I know what your Honor means. In other words, if we have a case of an ordinary patent and no reissue involved at all, and that patent issues after someone starts making that device, there is no such thing as intervening rights in that case.

The Court: But who has the first claim to that device? Is it the first man that asked for it?

Mr Flam: Often that is the case but, if there are two rivals, both of whom desire to obtain a patent, the Patent Office decides who is the first inventor in point of time and to the first inventor goes the patent protection. In this case there is no question of priority because we date our application back to December, 1934, and at least the presumptive date of invention is no later than that. Of course, the Crosley Corporation does not pretend it was doing anything in connection with this field until long after December, 1934. So there is no question of priority here. I don't know whether I have answered your Honor's question or not.

(Testimony of Charles E. Kilgour.)

The Court: You have answered it.

Mr. Flam: I don't think your Honor ruled on this. I offered this in evidence. [535]

The Court: Is there any objection?

Mr. L. S. Lyon: No objection.

The Clerk: Plaintiff's Exhibit No. 32.

The Court: One of the arguments in this case may be on the very theory of law that you are advocating.

Mr. Flam: Yes.

The Court: That is one of the points that you gentlemen will have to argue.

Mr. Flam: I am afraid so.

The Court: All right.

Q. (By Mr. Flam): I show you page 141 of the issue of Motor for April, 1938, and ask you whether that page discloses an advertisement by the Crosley Corporation of a set incorporating the push button mechanism of Exhibit No. 10.

A. It does, or not Exhibit No. 10. You see, Exhibit No. 10 is for this particular dial and the automobile receiver had an entirely different dial. So there would be a different set of arms up here or something of the kind.

Q. But the push button was the same, is that right? A. I believe so.

Mr. Flam: I offer that page in evidence, your Honor.

Mr. L. S. Lyon: No objection.

The Court: Admitted.

(Testimony of Charles E. Kilgour.)

The Clerk: Plaintiff's Exhibit No. 33.

Q. (By Mr. Flam): I have two more here. The first is page 43 of the April, 1938, issue of the Automobile Guide. [536] Will you answer the same in connection with that advertisement?

A. It appears to be the same advertising copy as in the other issue.

Mr. Flam: I offer that page in evidence.

Mr. L. S. Lyon: No objection.

The Court: Admitted.

The Clerk: Plaintiff's Exhibit No. 34.

Q. (By Mr. Flam): Last, I show you page 15 of the issue of April, 1938, of the Automobile Trade Journal. Will you answer the same question with regard to that advertisement?

A. It appears to be the same advertising copy.

Q. To your knowledge, do you know whether there were any other advertisements about that period similar to these shown in these magazine pages?

A. Not from my personal knowledge, although I know we did quite a bit of substantial advertising.

Mr. Flam: I offer page 15 of the April, 1938, issue of the Automobile Trade Journal in evidence.

The Court: Admitted.

The Clerk: Plaintiff's Exhibit No. 35.

Mr. Flam: That is all.

Mr. Yungblut: No redirect examination.

Mr. L. S. Lyon: At this time the defendant desires to offer in evidence a certified copy of the file

wrapper and contents in the matter of original patent No. 2,108,538. [537]

The Court: Is that the 1934 or the 1938 patent?

Mr. L. S. Lyon: That is the file wrapper upon which the original patent containing this original claim 5 was issued and the application was filed on June 19, 1937, so it seems.

Mr. Flam: I think that is the patent upon which the reissue was based; not the 1934 case.

Mr. L. S. Lyon: Not the parent one?

Mr. Flam: No.

The Clerk: Exhibit H.

Mr. L. S. Lyon: As Exhibit I, we offer a certified copy of the file wrapper of the reissue patent in suit No. 20,827. Those two file wrappers together, your Honor, will give you the Patent Office actions and the replies thereto and show what claims were allowed and how they were distinguished from claims that were rejected both in the original patent and in the reissue patent. We call Dr. Mackeown.

Mr. Lyon, Jr.: I also offer in the same manner and to be copied into the transcript the testimony of Gibson Yungblut as the same appears on pages 475 to 484 of the Associated record.

Mr. Flam: No objection to that, your Honor. I think we stipulated to that.

The Court: The same order with respect to that.

(The matter referred to to be copied into the record appearing on pages 475 to 484, inclusive, of the record [538] in the case of LeRoy J. Leishman v. Associated Wholesale

Electric Company, appears in the following words and figures, to wit:)

GIBSON YUNGBLUT

a witness for the defendant in sur-rebuttal, being first duly sworn, testified as follows:

The Clerk: Will you state your name?

A. Gibson Yungblut.

Direct Examination

By Mr. L. S. Lyon:

Q. Mr. Yungblut, you are one of the attorneys for the defendant in this case and a member of the firm of Allen & Allen, patent lawyers, of Cincinnati, are you not? A. Yes.

Q. In 1937 and 1938 you were, at that time, as well as now, attorneys for the Crosley Corporation?

A. Yes.

Q. I show you Plaintiff's Exhibit No. 38. Did you write that letter to Mr. Leishman?

A. Yes.

Q. You have heard Mr. Leishman's statements a moment ago as to the fact that, if you had obtained a copy of the file wrapper of his patent Serial No. 2,084,851, or had examined or known of his foreign patent applications, you could have found therein a reference to or a disclosure of a device disclosed in the reissue patent involved in this suit? You heard that testimony, did you not?

A. Yes.

Q. Will you please tell the court whether or not

(Testimony of Gibson Yungblut.)

you did obtain, prior to March, 1938, a copy of the file wrapper of the patent mentioned in your letter, Exhibit No. 38, or had any knowledge of the contents therein or of the device described in the re-issue patent here in suit or of any foreign patents or patent applications of Mr. Leishman's describing such a device?

A. No; we had no file history of patent No. 2,-084,851 until March of 1938. This is the first time I have ever heard of the foreign patents. I think your question had a third part which I have forgotten.

Q. Well, those are the two points I was interested in. I don't remember a third part. With reference to the patent applications that were filed on behalf of the Crosley Corporation covering the accused tuner involved in this case, you prepared and filed those applications, did you not?

A. Yes; I did.

Q. And, as I understand from you, none of those applications attempted to claim as an invention the feature of coaxiality of the pivot which has been mentioned in this case. And will you tell the court what you have done relative to obtaining the files on those applications for his [540] Honor's inspection?

Mr. Flam: Just a moment. I object to that question on the ground that it calls for the witness testifying regarding the contents of documents not in court.

(Testimony of Gibson Yungblut.)

Mr. L. S. Lyon: I mean a statement of the circumstance. I understood you objected to the witness testifying to that point and I am asking him to tell what he has done.

The Court: The court accepts counsel's statement they have attempted to get a copy and it is supposed to be on its way.

Mr. L. S. Lyon: And it will be here. I am surprised it is not here right now.

The Court: I don't know that it is material to the case at all. I can't see its materiality except, as I stated, naturally, it aroused curiosity in the court's mind but whether that curiosity is material to any of the issues in this case is very doubtful.

Mr. L. S. Lyon: We haven't anything to conceal from your Honor and we wanted your Honor to see just what the situation was.

The Court: Mr. Yungblut, have you any knowledge or information at all that indicates that any information was obtained from any of the patents or applications for patents of the plaintiff in this case upon which your automatic tuner was founded?

A. None whatever. [541]

Q. Have you any information that any member of your firm or any representative of the defendant in this case obtained any information from the files at Washington? A. No, they did not.

Q. Do you have any reason to believe that they did? A. No. In fact, I know they did not.

Q. As far as you know, their development was

(Testimony of Gibson Yungblut.)

independent entirely of any disclosures of the plaintiff?

A. Yes, that is correct.

Q. You were present when the discussion occurred with the plaintiff relative to claim 5, were you?

A. Yes.

Q. What is your recollection of that conversation? Is it about the same as the plaintiff testified to here?

A. Yes. I think, in general, the plaintiff has stated it quite fairly. We took the position that the claim was not infringed, giving, in general, the reasons that he gave.

Q. And what response did the plaintiff make to that?

A. Well, as the plaintiff pointed out, the conversation lasted about an hour. The plaintiff made no satisfactory response to that in the sense of answering the contention as I recall it. He did talk about the possibility of a disclaimer and at one part of the meeting or conversation, when I think Mr. E. S. Allen was present, he mentioned something about the dangers of qualifying disclaimers. But there [542] was no answer to the point that we made, so much so——

Q. What was the point that you made at that time in your discussion with him?

A. The point that we made may be summarized in this way, that the claim in its language refers clearly to a lever mechanism and could not refer to any such mechanism as is shown in the accused

(Testimony of Gibson Yungblut.)

device here. Our statement was, as I recall it, not having the language of the patent before me, that means movable about a pivot and acting—I am not quoting the language of the claim but as nearly as I recollect it—acting to contact an arm of the rocker and push it in one direction until the rocker is stopped by collision of the other arm of the rocker and the other contact toe of the cam or tappet, was language which related to the action of the device during tuning; that during tuning, so far as the tappet or cam is concerned, it is necessary that it be not movable about a pivot but fixed.

Q. At that time was the discussion centered primarily around claim 5? A. Yes.

Q. That was the only claim that it was claimed you people were infringing? A. Yes .

Q. Was there any discussion at that time relative to claim 5 being too general or too broad? [543]

A. Do you mean in the sense that it was anticipated by the prior art?

Q. Yes. A. As to being too broad?

Q. Yes. A. I don't recall that; no.

Q. Did you say there was some discussion of a disclaimer on claim 5 at that time?

A. Mr. Leishman, as I recall it, either mentioned disclaimers or said that he might endeavor to fix up the claim by a disclaimer.

Q. What was wrong with claim 5?

A. The thing that was wrong with claim 5 was that it didn't cover the Crosley device according to our contention.

(Testimony of Gibson Yungblut.)

Q. Well, did it cover any device?

A. Yes; it covered the device shown in the Leishman patent.

The Court: That is all.

Cross-Examination

By Mr. Flam:

Q. In considering Claim 5 of this patent, is there any statement there about a lever?

A. I am sorry but I didn't hear that.

Q. Is there any statement in there about a lever?

A. The word "lever" does not appear in the claim as [544] I recall it.

Q. You looked over all of the claims of the original patent, didn't you? A. Yes.

Q. At that time? A. Yes.

Q. There is no doubt in your mind that Claim 1 definitely refers to a lever, is there?

A. May I see the patent, if you please?

Q. Yes.

A. Does Claim 1, Mr. Flam, contain the word "lever"? Is that what you mean?

Q. Yes. A. Yes.

Q. That is an element of that claim, isn't it?

A. Yes.

Q. It also includes, as a separate element, a plurality of adjustable members pivoted to said lever, does it not? A. Yes.

Q. How did you construe that particular element?

(Testimony of Gibson Yungblut.)

A. Perhaps I don't understand your question but the particular words you have read I construed as calling for a lever, and then the claim goes on to state how it is mounted and the plurality of adjustable members I understood to [545] relate to the cams or tappets which are shown in Leishman's drawings and are marked 61 and 62.

Q. They are referred to in Claim 1, aren't they, as a plurality of adjustable members pivoted to such lever? A. Yes.

Q. Did you have any difficulty in construing that expression to mean the tappet? A. No.

Mr. Flam: That is all.

Mr. L. S. Lyon: I have no further questions, Mr. Yungblut. Except for this matter of the applications to arrive, we have no further evidence, your Honor.

Mr. Flam: We have nothing further.

The Court: How long do you gentlemen want to argue?

Mr. Flam: How long do you want to argue, Mr. Lyon?

Mr. L. S. Lyon: The three points your Honor suggested yesterday afternoon I am prepared to argue.

The Court: I am frank to say, gentlemen, that I am not interested very much in a discussion of the facts. They are all quite fresh in the court's mind and as far as the testimony in this case is concerned there has been practically no conflict. At least I can't determine any serious conflict be-

tween the testimony of the witnesses on either side. It is going to be a problem for the court to try to get the law and the facts together in a way that it can work [546] out maybe a just judgment. I am interested in having your records complete in this case so that any decision that I may render may be fairly placed before the Circuit Court of Appeals, so that, if I am in error, such injustice may be corrected. I have very definite conclusions relative to the facts in this case. I don't know whether I can gain more by submitting the matter on briefs and having you discuss it at length or whether I can come nearer rendering a judgment in accordance with the thoughts I have in mind at this time. This case has been my sole source of study for a week now and I have tried to read and study the cases. As far as I know, there is no conflict in the court's mind as to any point of law. At least, I can't discover any except the one point that I raised yesterday and the point that you mentioned in your pretrial brief. So I am going to ask to hear from the parties at 2 o'clock. And I will be glad to hear any points that either one of the parties may desire to make. I want everybody to have their full say in the matter, as I do not wish anybody to feel that they have been shut out. Are those the lost exhibits that just came in?

Mr. Yungblut: These are the lost exhibits, if your Honor please.

The Court: Do you wish to introduce them?

Mr. L. S. Lyon: Yes, your Honor. We can

open them up first and see if they are what we ordered.

The Court: I would suggest in this regard that they [547] be made available to counsel for the plaintiff and perhaps there can be a stipulation, after examination, as to the general contents of those applications. The court is primarily interested in ascertaining whether or not the defendant is claiming a patent on any of the matters covered by the plaintiff's patent. And, if counsel for the plaintiff may examine those applications, perhaps with Mr. Lyon's help and an understanding of the English language, you probably will be able to apprehend and determine their meaning.

Mr. Flam: I am afraid, your Honor, I can't do it between now and 2 o'clock, with all of those file wrappers.

The Court: How many applications are involved?

Mr. Yungblut: I think there is the one which has already been introduced, a divisional case of that or a case of which that is a divisional part, I forget which, and one other case on an analogous or related structure; which I don't believe is really pertinent here.

Mr. Flam: May I inquire whether these are all of the applications that relate to mechanical push-button tuning that are now owned by the Crosley Radio Corporation?

Mr. Yungblut: No; they are not.

Mr. L. S. Lyon: They are all the cases that involve the accused tuner, are they?

Mr. Yungblut: They are the only cases that involve the accused tuner.

Mr. Flam: How many of them did you say there are? [548]

Mr. Yungblut: I haven't looked over these but I told the office to send everything there was. But what I just stated I think is correct.

Mr. L. S. Lyon: In other words, the main patent is already here and you have a certified copy of it. Do you think there is only one other?

Mr. Yungblut: There is a division of that.

Mr. L. S. Lyon: And one more?

Mr. Yungblut: And one more. [549]

Mr. Flam: While we are on that subject, there is one other deposition that I should like to offer. That is the deposition of Lewis Crosley in the same proceeding. However, I would like to call your Honor's attention to the fact that that witness be construed as an adverse witness under Rule 43(b) of the Rules of Civil Procedure. I wouldn't like to be bound absolutely by what he says. He was one of the officers of the Crosley Corporation. There are some aspects of his testimony that we would like to use. If I may offer it with the understanding that he is an adverse witness.

Mr. Lyon, Sr.: If your Honor please, I object to that. Crosley is not an adverse witness. He is not in any way connected with the plaintiff in this case.

The Court: What was the form in which the deposition was offered previously in the other case?

Mr. Flam: The depositions were taken in Cincinnati by the then defendant, or, rather, on behalf of the defendant, and under the authority of the Crosley Radio Corporation.

The Court: There was no reservation made there as to the manner in which it was to be considered by the court in that case?

Mr. Flam: Of course, in that case the testimony was offered on behalf of the defendant, the Crosley Corporation and the Associated Wholesale Electric. In this case, of course, they are not a party. But Yungblut and Kilgour are [550] members of the same organization; Yungblut was the attorney representing Crosley, and Kilgour, I believe was identified as one of the chief engineers in connection with the radio department, and they were all adverse witnesses to us.

I wanted to round out this testimony and have Lewis Crosley's testimony accepted with that understanding, that it is the testimony of an adverse witness.

The Court: Well, I don't know as the court should restrict the reception of the deposition, but you could argue in your briefs the portions of it that either of you feel you should or should not be bound by. You can argue that in your briefs. The reception of it at this time should be without restriction, subject to the right of the litigants to discuss in their briefs the effect the court should give it in the evidence.

With that understanding it will be received.

Mr. Flam: With that understanding I will offer in evidence the testimony of Lewis Crosley as it appears on pages 326 to 335 of the record in the Associated Wholesale Electric case.

(The matter referred to to be copied into the record appearing on pages 326 to 335, inclusive, of the record in the case of LeRoy J. Leishman v. Associated Wholesale Electric Company, appears in the following words and figures, to wit:) [551]

LEWIS M. CROSLLEY

a witness called on behalf of the Defendant, being by me first duly cautioned and sworn, deposes and says, in answers to questions propounded to him by Marston Allen, Esq., of counsel for Defendant, as follows, to wit:

Direct Examination

By Mr. Allen

Q. Please state your full name, and age?

A. Lewis M. Crosley; 51.

Q. And your residence?

A. 5764 Belmont Avenue, Cincinnati, Ohio.

Q. With what company are you connected and in what capacity?

A. Connected with The Crosley Corporation, as Executive Vice-President.

Q. As such, are you familiar with the products manufactured and sold by The Crosley Corporation?

A. Yes.

(Deposition of Lewis M. Crosley.)

Q. Will you give us a brief history of the work that was done by the Corporation in connection with tuning devices for radio receivers not using the conventional rotary dial tuning? Give dates to the extent that you can.

A. In the year 1937 our engineers developed and used a motor driven method of tuning the variable condenser in some models of radio receivers in our lines. [552]

Q. And how did this work?

A. This worked by driving the condenser with a motor, which started and stopped by push button control. The motor would move the condenser from its former position and carry it slowly to the new desired position of the condenser, which was determined by the button you pushed.

Q. Now, what part of 1937 was that, if you can recall?

A. That was in the early part of 1937.

Q. Were you satisfied with that mode of tuning?

A. We were not entirely satisfied with that method of tuning, because of the fact that we found it to be costly and slow in operation, so our engineers in charge of the work of development hit upon the idea of a push button mechanism which was direct and positive, entirely manual in control, not requiring the use of an electric motor.

Q. Had you known of the manual button tuning previous to the experience of which you speak?

A. We knew of a method used by Zenith over a period of years which we called the cash register

(Deposition of Lewis M. Crosley.)

type of tuning, which had been on the market for some time but was not particularly popular as a sales feature.

Q. When you say "cash register tuning," what do you mean by that?

A. I mean a tuning device which was largely made up [553] of levers, in which, instead of pushing directly in, as our type was developed, they pushed down in a cumbersome sort of method.

Q. Now, you say that your device which was worked up, pushed directly in?

A. Our device that our engineers developed was small and compact and worked on the principle that the buttons were pushed straight in and not downward.

Q. Now, do you have any recollection of a visit of LeRoy J. Leishman to The Crosley Corporation in the fall of 1937? A. No.

Q. Did your company come out with a push button, push rod type of tuning device? A. Yes.

Q. I show you a tuning device on one of your models 718-C, and ask you if this is the tuning device to which you refer? A. Yes.

Q. When did you first ship radio receivers with those tuners in them?

A. We commenced shipping radio receivers with this type of tuning in January, 1938.

Q. In what receiver?

A. In a low priced automobile set model. [554]

Q. How many models did you incorporate this tuning device in at that time, and why?

(Deposition of Lewis M. Crosley.)

A. We incorporated this tuning device in one model receiver at that time.

Q. And why only in one model?

A. We were at that time developing and preparing for the market a low priced automobile set to sell at the attractive price of \$19.98 retail, and we found it possible to use this device to make the set more acceptable and at the same time test the marketability of this particular method of tuning.

Q. Did you consider that you had anything exclusive in that tuning device for your company's products? A. Yes.

Q. What was it?

A. We felt that we had overcome the objection to the types of tuning previously used, both manual and electrical, because of the use of a direct push rod acting to rotate the condenser.

Q. While you were going through this test period, did you receive, or was there brought to your attention a letter from LeRoy J. Leishman to your company? A. Yes.

Q. Do you have a copy of the letter before you?

A. Yes, I have a copy of the letter before me.

Q. Attached to that letter is a photostat of part of a patent. Was that received with the letter?

A. Yes.

Mr. Allen: I have pinned the photostat to the letter so that it will not become lost. I offer the letter with the photostat attached in evidence as Defendant's Exhibits 7 and 7-A respectively.

(Deposition of Lewis M. Crosley.)

Q. Was there anything else included in the way of a document with Exhibits 7 and 7-A?

A. Yes, there was a copy of a license agreement with the letter and a page of a patent listed as Exhibits 7 and 7-A.

Q. As a matter of fact, Mr. Crosley, there were two copies of the agreement, is that not correct?

A. Yes, I believe there were.

Mr. Allen: I will offer the one copy to which the witness referred, in evidence as Defendant's Exhibit 7-B.

Q. What did you do upon receipt of this letter and other documents?

A. I consulted with our engineers and our patent attorneys, because I was very much surprised and worried to find that there was any question concerning the new tuning mechanism which our engineers had developed.

Q. Did you reply to Mr. Leishman?

A. Yes, I replied to Mr. Leishman on February 25, 1938.

Q. Do you have a carbon copy of your letter to him [556] at that time?

A. Yes. (Produces same.)

Mr. Allen: I ask that the carbon copy of the letter to which the witness referred, be received in evidence as Defendant's Exhibit No. 8.

Q. Did you receive, then, a response from Mr. Leishman, and if so, do you have it with you?

A. Yes. In March, I received a letter dated the

(Deposition of Lewis M. Crosley.)

9th from Mr. Leishman, in which he enclosed a copy of the patent 2108538.

Q. Do you have the letter and the patent that was attached? A. Yes. (Produces same.)

Q. The date stamp on the patent shows March 11, 1938. Does that identify this patent to you as having been the one that came with this letter?

A. Yes. It is customary for our mail desk to stamp documents when received.

By Mr. Allen: I ask to be received in evidence the letter to which the witness has just referred, as Defendant's Exhibit No. 9, and the copy of the patent as Defendant's Exhibit No. 10.

Q. Now, by the time you received a copy of this letter and the patent to which you have just referred, had you consulted with your engineers and attorneys with reference to [557] the applicability of the Leishman claim to your tuning devices?

A. Yes.

Q. And did you communicate with Mr. Leishman on the 11th day of March with reference to this claim?

A. Yes, I wrote Mr. Leishman on March 11, 1938, and told him that we found that we could not employ the use of a lever in our device, that "We are using a straight push-button type, which we do not believe comes under your patent."

Q. State whether or not you wrote that upon advice of your counsel and your engineers and experts. A. Yes.

(Deposition of Lewis M. Crosley.)

Mr. Allen: I ask to be received in evidence a carbon copy of the letter last referred to, as Defendant's Exhibit No. 11.

Q. With regard to reports of your engineers state whether you have in your files a copy of any correspondence which epitomizes the reports to you.

A. We have a copy of a letter written March 14, 1938, to our patent attorneys, Allen and Allen, signed by Mr. H. J. Tyzzer, Chief of the Household Radio Division of The Crosley Corporation.

Q. State whether or not that sets forth what Mr. Tyzzer reported to you. [558]

A. This letter explains the report that Mr. Tyzzer gave me concerning Mr. Leishman's letter and patent. I instructed Mr. Tyzzer to write accordingly to our attorneys, Allen & Allen.

Mr. Allen: I ask to be received in evidence the carbon copy of the letter referred to, as Defendant's Exhibit No. 12.

Q. I hand you a sheaf of correspondence and telegrams, containing a letter from Mr. Leishman of March 12, 1938; a second letter to you from Mr. Leishman dated March 17, 1938; a letter from you to Mr. Leishman dated March 21, 1938, and telegrams dated March 27 and 28, 1938, and ask you if you can identify this sheaf of correspondence?

A. Yes, I can identify the sheaf of correspondence.

Q. From whose files did it come?

A. It came from my files.

(Deposition of Lewis M. Crosley.)

Q. Do you recall the sending and receiving of that correspondence? A. Yes.

Mr. Allen: I ask that the correspondence and telegrams be received in evidence as Defendant's Exhibits 13-A to 13-E, inclusive.

Q. Now, Mr. Crosley, after you had written the letter of March 11 to Mr. Leishman, to which you have referred, what did you do with regard to the use of the [559] accused tuning device in the receivers of your company?

A. About that time our field tests made by the sale of a low priced automobile receiver indicated that our new tuning device was acceptable as a sales feature, and by this time we felt free to incorporate this method of tuning from a patent point of view in other models of receivers being developed for the coming year's line.

Q. And did you in fact incorporate that tuning device in various models? A. Yes.

Q. What do you mean by "from a patent point of view" in your last answer?

A. Up to this time, the only patent that had been brought up against us was this one of Mr. Leishman's and in view of the fact that we did not feel that we infringed this patent, we felt free to use this device in other models.

Q. Did Mr. Leishman come down to Cincinnati for a conference, if you recall, after this last correspondence that we put in evidence, Exhibits 13-A to 13-E?

(Deposition of Lewis M. Crosley.)

A. I was told that he came to Cincinnati, but I had no contact with him.

Q. What is the next letter that you received with regard to this Leishman patent, in behalf of Mr. Leishman?

A. In August we received a letter from Mr. Leishman's [560] attorney, Mr. John Flam, advising us that his patent had been reissued.

Q. Do you have that letter with you here?

A. Yes, this is the letter which we received registered mail, advising us of the reissue of the patent.

Mr. Allen: I ask that the letter to which the witness has just referred, be received in evidence as Defendant's Exhibit No. 14.

Q. State whether or not you had heard previous to that time that a reissue patent had been allowed to Leishman.

A. I was told shortly before that time something about a reissue patent.

Q. How far had you gone with your receiving set designs for the ensuing season by the time you received word that Leishman had a reissue patent?

A. Our full line of receiving sets was in production, and quantities of them had already been shipped to the field.

Q. What about changing your designs at that late day for the ensuing season?

A. It would have been impossible to have changed our designs at that time.

Q. Had you ever received any word from anyone

(Deposition of Lewis M. Crosley.)

that Leishman was filing an application for a reissue patent previous to being told that a reissue patent had been [561] granted to him? A. No.

Mr. Allen: Direct Examination closed.

No cross examination.

And further, deponent saith not.

LEWIS M. CROSLEY.

Mr. Flam: That deposition refers to documentary exhibits in this Volume III.

The Court: Volume III of the record in the Court of Appeals?

Mr. Flam: Yes, in the Associated Wholesale Electric case.

On page 663 of the record, "Defendant's Cincinnati Exhibit No. 7B" is the title for it, which was referred to in the Crosley deposition, and it continues to and including page 668.

And then immediately following page 669, "Defendant's Cincinnati Exhibit No. 8.

I offer those in connection with the deposition of Lewis Crosley.

(The matter referred to to be copied into the record appearing on pages 663 to 669, inclusive, of the record in the case of LeRoy J. Leishman v. Associated Wholesale Electric Company, appears in the following words and figures, to wit:)

Defendant's Cincinnati Exhibit No. 7B

License Agreement

Whereas, LeRoy J. Leishman, of Los Angeles, California, hereinafter called the Licensor, is the sole owner of Letters Patent No. 2,084,851, 2,108,538, and D-108574 and of a series of patent applications pertaining to lever and/or push-button operated tuning devices and tuning scales; and

Whereas, Crosley Radio Corporation, a corporation of the State of _____, hereinafter called the Licensee, is desirous of manufacturing and/or selling apparatus embodying the inventions described in said Letters Patent and/or patent applications.

Now, therefore, in consideration of the sum of One Dollar (\$1.00) and other valuable considerations in hand paid by the Licensee to the Licensor, the receipt of which is hereby acknowledged by the Licensor, and in further consideration of the mutual agreements herein contained, the parties hereto agree as follows, to wit:

First: Subject to the conditions herein contained, the Licensor hereby grants to the Licensee a non-exclusive license to manufacture or assemble tuning units embodying said inventions in its own plants for installation in radio, and/or television sets manufactured by the Licensee, and to embody in said sets any of the designs covered by said patent or applications and to sell the sets in which such [564] units are installed, or in which said designs are embodied, throughout the United States and the ter-

ritories thereof until the expiration of the last Letters Patent on said inventions or on any improvements thereon made or acquired by the Licensor. It is understood, however, that no license is hereby granted to the Licensee to sell tuning devices embodying said inventions disassociated from receivers.

Second: Between the first and thirtieth days of each and every January, April, July and October, during the life of this Agreement, the Licensee shall make full, true and correct reports in writing to the Licensor, and such reports shall state the total quantity of each type of radio and/or television set and/or other device made under this license during the period for which such report is made, each type designated by the manufacturer's model number, and if a mechanical or electrical tuning device, the type shall also be designated by the number of operating levers, buttons or other individual station selecting members thereon. Each such report shall cover all receivers or other devices made under this license during the preceding three months, excepting the first report, which shall cover all such receivers or devices made prior to the date of such report. Each report shall be verified under oath of the person in charge of the books of the Licensee.

Third: Each report made in accordance with paragraph "Second" hereof shall be accomplished by a royalty payment to [565] the Licensor of one and one-half cents ($1\frac{1}{2}c$) per lever, button or other member that may be adjusted so that its subsequent

operation will tune in a pre-determined station, for each set shown by such report to have been made by the Licensee during the period for which such report is made; but if such units are constructed so that they may be used for simultaneously turning radio and television tuning shafts to any angular position, irrespective of the angular position of the other shaft, or if the tuner is motor driven, the royalty rate shall be double the rate hereinabove set forth.

On receivers on which royalties are payable according to the above schedule, no additional royalties shall be required because of the inclusion in said receivers or devices of any tuning scale and/or design invention covered by any of said patents or applications; but on receivers on which royalties are not payable according to the above schedule, the royalty payment accompanying said report shall be two and one-half ($2\frac{1}{2}c$) cents for each dial or tuning scale covered by any of said applications or patent resulting therefrom, and two ($2c$) cents per set or separate escutcheon embodying a design invention covered by any of said applications or patent resulting therefrom.

Fourth: When devices embodying the inventions under which this license is granted, are purchased by the Licensee from a concern licensed to make such devices for resale, [566] it is understood that no royalties are payable by the Licensee under this License on sets or receivers or other devices in which such licensed devices are installed.

Fifth: Should the royalty payments under paragraph "Third" for any calendar year be less than Six Hundred Dollars (\$600.00), the Licensee shall pay to the Licensor an amount sufficient to make the total amount paid for such calendar year the sum of Six Hundred Dollars (\$600.00); and in the event of failure to make such minimum payment, this contract will terminate sixty (60) days following the end of the calendar year for which such payment was due.

Sixth: The Licensee shall keep full, true, and correct books of account in which shall be entered all transactions conducted under the license hereby granted, and said books and all other records of the Licensee pertaining to operations under this license shall at all times during business hours be open to the inspection of any certified public accountant duly authorized by the Licensor to examine such books and records for the purpose of verifying reports by the Licensee and ascertaining whether all royalties due to the Licensor have been paid.

Seventh: The Licensee shall mark all devices manufactured and/or sold hereunder and all advertisements for said devices with a legal notice of the patent and application under which this license is granted, which notice of the [567] patent and application shall consist of the words, "Licensed under Leishman Patents No. 2,084,851 and 2,108,538 and Leishman patents pending."

Eighth: If the Licensor shall make any improvements involving the use of the inventions licensed

hereunder, or shall acquire any United States Letters Patent covering such improvements or the right to grant licenses under such patents, all such improvements and patents shall be included in the license hereby granted, and no additional royalties with respect thereto shall be required unless it is with respect to a patent or licensing right acquired from a third party at the request of another licensee that agrees to pay additional royalties with respect thereto, in which case the licensee shall have the option to embody the same invention in its products at the same additional royalty rate as that paid by said other Licensee.

Ninth: Should any subsequent licensing agreement on said inventions between the Licensor and a radio and/or television set manufacturer contain a royalty arrangement that the Licensee prefers to the terms of this agreement, the Licensor agrees, at the request of the Licensee, to amend this agreement to include the same provision or arrangement.

Tenth: If the Licensee in any way violates the provisions of this Agreement, the Licensor may at his option terminate this license. Termination of the license under [568] this paragraph may be made by service on the Licensee, either personally or by registered mail, of a notice specifying as the date of such termination a date at least thirty (30) days following the date upon which the notice is served and specifying in detail the particulars in which the Licensee is in default, or has violated the provisions hereof. If the particulars so speci-

fied constitute anything other than a wilful violation of the terms hereof on the part of the Licensee and if the Licensee makes good its default and notifies the Licensors within the period of thirty (30) days following the service of such notice that it has done so, the license shall continue in full force and effect.

It shall be the duty of the Licensee upon making good its default as provided above to apprise the Licensors before the expiration of said period of thirty (30) days of the acts relied upon by it as remedying the particulars in which it has been in default, or in which it has violated the terms of this Agreement, and in the absence of such appraisal his license will terminate on the date specified in the notice.

Eleventh: All notices, statements, requests, demands or communications required to be given, or which any party hereto may desire to give hereunder, shall be in writing, duly signed by or on behalf of the respective party giving the same, and shall be sufficiently served or given if delivered by messenger or sent by United States Registered Mail, postage prepaid, addressed to the party to whom the same should be given at the following address, or such other address as either party hereto may from time to time furnish to the other for such purpose.

LeRoy J. Leishman, 341-343 No. La Brea Avenue,
Los Angeles, California;

Crosley Radio Corporation, 1329 Arlington, Cincinnati, Ohio.

Twelfth: No termination of the license herein conferred shall relieve the Licensee of any previously accrued obligation as outlined herein.

Dated this day of, A.D. 1938.

.....,
Licensor.

Witness:

CROSLEY RADIO
CORPORATION,
Licensee.

By

Witness:

[Endorsed]: Filed Mar. 11, 1940. .

R. S. ZIMMERMAN,
Clerk.

Defendant's Cincinnati Exhibit No. 8

February 25, 1938

Mr. L. J. Leishman,
Stevens Hotel,
Chicago, Illinois. [570]

Dear Sir:

Your letter of February 22, together with copies of contracts, addressed to Mr. Powel Crosley, has been turned over to me.

We can tell nothing from the photostatic copy of the one sheet of the patent, which you attached to your letter.

We have ordered a copy of this complete patent,

and will advise you further when we have had time to study it.

Very truly yours,

THE CROSLEY RADIO
CORPORATION,

LEWIS M. CROSLEY,
Executive Vice President.

LMC:EB

[Endorsed]: Filed Mar. 11, 1940.

R. S. ZIMMERMAN,
Clerk.

By C. E. HOLLISTER,
Deputy Clerk. [571]

Mr. Lyon, Sr.: We offer in evidence and ask it be deemed read and copied into the record in this case, the testimony of Leslie K. Loehr, taken before Judge Harrison in the Associated case as it appears in the printed transcript of the record in that case, page 231 to page 281.

We have no stipulation as to the admissibility of Mr. Loehr's testimony. As I understand it, Mr. Flam doesn't make any point of incorporating it here in the physical manner that we have indicated, but his point is as to his competency.

Ordinarily, as I understand it, the testimony taken in another cause of action where the parties are different is not admissible in a subsequent action, but we feel that this is an exception, it comes under an exception to that rule, because this was

a witness that was produced by Mr Leishman in that case and testified as a witness for Mr. Leishman, not for his opponent in that case, and as I understand the exception that I contend renders this evidence admissible, if a party has tendered a witness and used his testimony, that is, an adoption of his testimony, it is considered in the nature of an admission as to his testimony, and renders the testimony admissible against the party who produced it and offered it, in subsequent litigation against other parties.

This academic point of evidence is considered in a [572] leading British case, *British Thomson-Houston Co. v. British Insulated & H. Cables*, 1923, 1 Chancery, 203; and the same case on appeal, 2 Chancery, 260.

There is a dissenting opinion of the justices in that case, and this proposition is discussed.

The most definite case in this country recognizing and approving this exception to the general rule is the decision in *Becker v. Philadelphia*, 217 Penn. 344; 66 Atlantic, 564. In that case, your Honor, the testimony of a physician who had been called by a party in an earlier suit against a third party was admitted for the purpose of contradicting the testimony of the same party in a later suit on the ground that having produced that physician and having used his testimony and contended for his testimony in the earlier case, that that was an adoption of his testimony and the testimony comes in having been used by the party and is ad-

missible in the later case in the nature of an admission by him.

The reason I would like Mr. Loehr's testimony is Mr. Loehr was produced as a witness in the Associated case by Mr. Leishman, he was the chief designer at Lockheed; he was examined as to whether or not this principle of coaxiality was a mere matter of well-known mechanical engineering and within the skill of an ordinary mechanic, and his testimony is quoted at length in Judge Harrison's opinion and was relied [573] upon by Judge Harrison. So I am submitting to the court the proposition that I believe it may be admitted here, over Mr. Leishman's objection, on the ground that he having produced it and offered it, it could be used against him in this case.

Mr. Flam: Your Honor, I don't know of any exception, I have studied the law regarding the admissibility of testimony taken in prior cases, and as Mr. Lyon said, the testimony of a witness taken in a case between other parties is not ordinarily admissible. It may be admissible if the testimony can be construed as an admission on the part of the person producing that witness. But I don't think there is enough foundation laid here to show that, and there should be no exception on that ground.

Witnesses in one litigation should not have the force and effect of offering the same testimony in other litigation, unless there are some special circumstances making it admissible as admissions against the party in interest.

The Court: I thought I remembered in Judge Harrison's opinion in this case of Leishman against the Associated Wholesale Electric Company some reference to that name.

Mr. Flam: Yes, your Honor.

The Court: I see it here.

Mr. Flam: As far as the Loehr testimony is concerned, I think all that is pertinent to the decision is reproduced in [574] the opinion itself.

The Court: There does seem to be an excerpt in the opinion appearing in 36 Fed. Supp. at 808, in which Judge Harrison states, "The plaintiff's expert Leslie K. Loehr testified as follows:"

I can see how if the court should reach the stage of this case in considering it as to what if any variance there is in the record before this court and that which was before Judge Harrison in another division of this court, that it might be proper for the court to consider such evidence. I don't know what the situation would be. I can't anticipate it. After a study of this case, after proper briefs, the court might come to the conclusion that entirely independent of the other case this case warrants the consideration of this division of the court. On the other hand, it might be that the court would conclude, after a thorough study, that the case was the same as that was submitted to Judge Harrison, and of course a different view would be taken, as I told you at the beginning. I have never been in sympathy with the idea that in coordinate courts, multiple courts of coordinate jurisdiction, that litigants should pick one judge or another

judge. It is the decision of the court. Unless there is some reason other than the mere desire of a litigant to have some particular judge pass on a case, there doesn't appear to be any good reason why that should be done in a [575] multiple court.

I think we can receive this subject to a discussion of it in the briefs.

(The matter referred to to be copied into the record appearing on pages 231 to page 281, inclusive, of the record in the case of LeRoy J. Leishman v. Associated Wholesale Electric Company, appears in the following words and figures, to wit:)

LESLIE K. LOEHR

called as a witness on behalf of plaintiff, being first duly sworn, was examined and testified as follows:

The Clerk: Will you state your name?

A. My name is Leslie K. Loehr.

Direct Examination

By Mr. Flam:

Q. What is your present occupation, Mr. Loehr?

A. I am a machine designer.

Q. Will you state in general what your past experience has been in connection with design of machinery or analogous materials?

A. Well, in addition to eight grades of school and high school I have had three years' schooling

(Testimony of Leslie K. Loehr.)

in engineering subjects, mechanical engineering subjects, at the University of Washington. I have had three years' apprenticeship in [576] machinery building and tool and die design; and the past 15 years I have been actively engaged in the development of inventions and patents and machines and tools and dies.

Q. Where are you at present employed, Mr. Loehr?

A. I am employed as methods and production engineer at the Lockheed Aircraft Corporation, Burbank, California.

Q. I forgot to ask you where you resided. Will you state that, please?

A. Oh, I live in Los Angeles at 6109 Saturn Street.

Q. Have you studied the patent in suit here, reissue No. 20,827?

A. Yes; I have studied this patent.

Q. You understand what it discloses?

A. Yes.

Q. I show you this radio set chassis which has been furnished to me by opposing counsel some months ago in connection with answers to interrogatories, and which I shall ask the clerk to mark for identification.

The Clerk: Exhibit 22 for identification.

Q. (By Mr. Flam): Have you studied that set especially with regard to the push button tuner?

A. With regard to the tuner; yes.

(Testimony of Leslie K. Loehr.)

The Court: Has the red tag any significance?

Mr. Flam: I think it is more in the nature of some instructions on how to install the set than anything else. [577] I don't think it is dangerous.

Q. Is that tuning mechanism in that Crosley set similar in structure to that exemplified by Plaintiff's Exhibit 10?

A. I would say that the push button mechanism is substantially the same.

Q. Using either of those two exhibits, Exhibit 10 or Exhibit 22 for identification, will you explain to the court the process of adjusting, or, rather, the structure of the Crosley push button mechanism, having in mind, of course, that we know something about it already, but particularly the manner in which the set is made?

A. He is pretty analytical, his Honor is, I think. Outside of the adjustment—maybe I can explain that to you and the necessity of loosening the screw which tightens the tappet.

The Court: That releases the tappet so you can set it?

A. That is right; so you can adjust the dial.

Q. For instance, if you want it over at 1500 you set it there and you tighten up your screw?

A. That is right; you tighten up your screw. It is done by throwing this out.

Q. And you throw it into 1500?

A. That is right; and it brings it back.

Q. (By Mr. Flam): Have you made any com-

(Testimony of Leslie K. Loehr.)

parison of the Crosley mechanism illustrated by those two exhibits, 10 and 22, with the mechanism illustrated in the Leishman patent in [578] suit? I want to have you use the chart in that connection (placing chart on easel). Is that all right for you, Mr. Loehr?

A. Well, yes. It might be necessary to——

Q. I will give you the pointer here. Did you make such a comparison of the Crosley tuning mechanism?

A. Yes; I have made such a comparison.

Q. Will you explain the similarities of the two mechanisms by the aid of the chart?

A. The chart is quite self-explanatory, but perhaps for the benefit of the court. On the right over here we find the——

The Court: I recognize——

A. ——all those elements.

Q. I recognize the plaintiff's five figures there of his patent.

A. The rocker and the tappet.

The Court: In Plaintiff's Exhibit 7. I recognize those.

A. Do you recognize these as of the——

Q. (By Mr. Flam): By "these" you mean which Figs.?

The Court: Referring to Figure C-1.

A. The tappet C-61 and the treadle bar of the rocker C-48.

The Court: Yes; I recognize them. [579]

(Testimony of Leslie K. Loehr.)

A. And the opening in the treadle bar for that portion of the tappet which must project into the treadle bar. Here is that white portion that represents the opening.

The Court: Yes; I see what you are referring to.

Q. (By Mr. Flam): Will you refer to Fig. C-5 for that?

The Court: Fig C-5 represents the——

A. Coaxial.

Q. ——the opening that you are referring to here as the coaxial movement?

A. That is right.

Q. To permit the coaxial movement?

A. That is right; that is correct.

Mr. Flam: Well, go ahead. I won't interrupt you. Use your own method of exposition.

A. Well, it is more or less obvious from the chart that the main object of the lever is to impart linear displacement to the tappet and movement down of that tappet in contact with the rotor as shown in Fig. L-2 will rotate the rotor to the angular position of the tappet as shown——

The Court: In other words, the lever is the means by which you bring the tappet in contact with the rocker to bring it into position?

A. That is right.

Q. I can understand that.

A. And over on this side the plunger is used for [580] imparting linear motion.

(Testimony of Leslie K. Loehr.)

Q. For the same purpose as in the other case?

A. That is right. One is a substitution for the other.

Q. But they do differ; one uses a plunger and the other uses a lever?

A. That is the only difference. The difference is that the necessity for imparting linear motion to the tappet, of course, is essential.

Q. The similarity of the two is the fact that both use a rocker——

A. Both use a tappet.

Q. And both use a rocker?

A. And both use a rocker, and both use means for imparting linear motion.

Q. There would have to be a means, wouldn't there——

A. That is right.

Q. There would have to be a means used to impart motion?

A. That is right.

Q. So the similarity is, is it, that they both use tappets and they both use rockers?

A. That is right.

Q. It is that method, you might say, of a combination of a tappet and a rocker—— [581]

A. That is correct.

Q. ——that connects up both of these tuners?

A. That is correct.

Q. (By Mr. Flam): And what about the relationship between the tappet and the rocker in the fully tuned in position?

(Testimony of Leslie K. Loehr.)

A. In both cases—I think your Honor can see that—the axes——

The Court: It is coaxial?

A. Coaxial, that is right.

Q. (By Mr. Flam): Do you have anything to say regarding the——

The Court: Is there any difference between coaxial and concentric?

A. Well, it depends upon what you are referring to, I mean when those terms are used. Concentric would mean that same shape about the center.

Q. I know, but when she is brought into place they are not using the axis, are they; they are simply in position?

A. They are in position, excepting their adjustment. Then the axis, of course, must be used.

The Court: And the axis is used for the purpose of adjustment?

A. That is right. [582]

Q. And then it is brought into a definite position, you might say, at rest, a definite position at rest? A. By aid of the cam maybe.

Q. Yes; at whatever angle the rocker may be set?

A. That is right.

Q. (By Mr. Flam): Is that illustrated on the diagram, Mr. Loehr?

A. Yes. There are two positions of the cam, or, rather, of the rocker.

Q. Reference character?

(Testimony of Leslie K. Loehr.)

A. Reference character 48 in Figure L. The rocker is tilted this way.

Q. L-2, you mean?

A. No; this is L-1, and this is the rocker for that: It is set sloping and the—well, let us say, sloping up to the right; whereas, in Figure L-3 it is sloping up at the left or to the left and the tappet happens to be adjusted in Figures L-1 and L-3 at approximately the same angle, and yet when the movement downward to the tappet is given and it finally comes to rest it moves the treadle to exactly the same position in each case.

The Court: May I ask, in mechanical work, the fact of coaxial, is there anything unusual about that in [283] your profession or specialty?

A. Well, to use the term "coaxial" loosely, no. I mean, many things are coaxial. I mean, for instance, you have a series of gears on a shaft, all of those gears are, of course, coaxial inasmuch as they all operate about the same center.

Q. The same result could be attained here by the use of a gear, couldn't it?

A. Well, I don't know just what you mean by using a gear here to accomplish this result that we have here by bringing this member coaxial with this member, or tappet 61 to 48—

Q. From a mechanical point of view, you are working at now, you said—what was your present position with the Lockheed?

A. Production and methods engineer for Lockheed.

(Testimony of Leslie K. Loehr.)

Q. And you are studying these matters all the time, aren't you?

A. Yes; we are continuing to study the machines and inventing new machines.

Q. Trying to?

A. Well, we succeed occasionally.

Q. Sometimes they drop?

A. What do you mean, the machines?

Q. After they succeed; yes. [584]

A. Oh, yes, yes.

Q. But the fact that a combination of parts are placed together in a coaxial position, is there anything unusual in that?

A. Not to use the term loosely; no.

Q. How, then——

A. Well, I mean by that, that as far as—well, there are many mechanical elements that are placed coaxial. For instance, this shaft is coaxial with this other shaft when it happens to be down on the same plane. You see what I mean? But now, where we introduce parts that may interfere bodily one with the other it is—well, people just don't do it because you have got to provide for the space for the parts to go in to become coaxial.

Mr. Flam: May I interpose a question that I think his Honor will be interested in?

Q. What is the importance of having this, what is the advantage of having it coaxial, the rocker and the tappet? In what way does it operate in a different manner than what you would ordinarily expect coaxial or other elements to operate?

(Testimony of Leslie K. Loehr.)

A. Well, the advantage is in the adjustment.

Q. Can you illustrate the adjustment by any model that you have?

The Court: Oh, I understand. [585]

Q. You mean the adjustment of placing it at a different angle?

A. Yes. Well, if it is not coaxial it makes quite a difference.

Q. Let us see. Calling your attention to Plaintiff's Exhibit 20 is that coaxial?

A. Yes; that is coaxial. The tappet is coaxial. It is operating about a phantom center; in other words, it is moving in a path to a center that coincides with the axis of the——

Q. Just what do I understand you mean by "coaxial"? I may be placing too narrow an interpretation upon it in my own mind.

A. Well, the term "coaxial" in this particular case applies to the imposition, let us say, of another part, or which cooperates with another part, so that the two may be moved or rotated about a common axis without any linear displacement of the means for holding the tappet in contact with the rotor or treadle bar or rocker, as it is called.

Q. This one, referring to Exhibit 20, does not protrude through or into the rocker at all, does it?

A. That is right.

Q. It works on the outside edges completely?

A. That is right.

Q. The advantage of the chart, or of Exhibit

(Testimony of Leslie K. Loehr.)

7, is in [586] the fact that it does protrude into the rocker, is it not?

A. That happens to be one mechanical embodiment of that feature so that the axis there physically and visually do coincide. In this particular case physically they do but visually they don't.

Q. The result is the same? A. Yes.

Q. But actually they do not?

A. Visually they don't. I mean by that—you can't see the axis of that.

Q. Yes; I understand that much. But, as I understand it, the coaxial movement—would you call it?

A. Well, the coaxial movement, yes, of the relative parts when they are in contact.

Q. Using it loosely, as I believe you used the expression, it is a more or less common mechanical term in use?

A. I don't know whether I get exactly what you mean.

Q. Here is what I am trying to find out. Is there anything new about the fact this is coaxial? Is there anything new to the mechanical art that anything is coaxial?

A. No; that is true, that there is nothing new in the mechanical art that things are made coaxial because, as I cited, there are plenty of gears on a shaft or pulleys on a shaft and all of those pulleys and gears are coaxial.

The Court: You may proceed. [587]

Q. (By Mr. Flam): I think you answered that

(Testimony of Leslie K. Loehr.)

there is some importance in connection with the setting of the mechanism illustrated by Plaintiff's Exhibit No. 7——

The Court: Do you mean setting it for the different stations?

Mr. Flam: For the different stations.

Q. ——to make the axis——

The Court: Is there any claim in this case as to the method of setting?

Mr. Flam: No; there isn't but there is a description of the manner of setting. Of course, what we propose to show is, if you don't have it coaxial, you are going to run into difficulties in setting. That is the importance of the coaxial relation.

The Court: The only thing is it seemed to be creating a state of confusion here. It has been testified about coaxiality and that coaxial is a phantom and then you have still another device here that is not coaxial.

Mr. Flam: That is right.

The Court: And yet they all have a method of setting and they all work?

Mr. Flam: Well, not quite.

The Court: And the plaintiff contends that the one he has made for the Los Angeles manufacturing concern, the latest one, is just as good as the other.

Mr. Flam: It employs a different invention.

The Court: I realize it employs a different invention.

Mr. Flam: I think we can clear this up.

(Testimony of Leslie K. Loehr.)

Q. I will ask, Mr. Loehr, whether you have read this Marschalk patent that has been introduced on behalf of the defendant, Defendant's Exhibit D. Have you a copy of it there?

A. Yes; I have a copy here.

Q. In that patent there is a tappet and rocker, I suppose, is that right?

A. Yes. Figure 14 shows a tappet 44 and a rocker 34.

Q. That tappet of Marschalk and the rocker I presume do not assume a coaxial relationship when the tappet is in complete contact with the rocker, is that right?

A. Yes; that is right.

Q. I think we have had testimony about that.

A. Yes; that has been generally discussed.

Q. Can you demonstrate with anything how the Marschalk device would operate if it was actually built?

A. At my suggestion, a Marschalk lever was built at the request of or by Mr. Leishman. I don't know who built it.

Mr. Flam: I would like to have the clerk mark this for identification.

The Clerk: Plaintiff's Exhibit No. 23 for identification. [589]

Q. (By Mr. Flam): Can you demonstrate how that mechanism will work in connection with the model Exhibit No. 7?

The Court: Where is your rocker here?

A. We have to use this mechanism here.

(Testimony of Leslie K. Loehr.)

Q. Do you put it right on there? A. Yes.

Q. (By Mr. Flam): Put it right alongside of the Leishman lever so as to compare the operation of it. Will you do that, Mr. Loehr? A. Yes.

Q. That is, install it on the rocker.

The Court: I would like to ask, Mr. Flam, if you still claim, in view of the testimony of the plaintiff in this case, whether the Eibel Process case decided by Judge Taft applies as the rule?

Mr. Flam: I do, of course. In this case we have made what I think is a very important improvement and, therefore, the inventor is allowed some range of equivalents, and this very point I am bringing out now will show——

The Court: The only thing is that the plaintiff himself under cross-examination, it appeared to me, tended to narrow his invention and also at the same time narrow the interpretation to be placed upon it.

Mr. Flam: I am not prepared to argue on how narrow the [590] invention must be construed but we do feel that this——

The Court: I am just trying to find out whether you had modified your theory from the time that you filed your pre-trial brief.

Mr. Flam: No; I don't think so, your Honor.

The Court: All right; you may proceed.

Q. (By Mr. Flam): Will you demonstrate it?

A. I have mounted Exhibit 23, a facsimile of the Marschalk device, on Exhibit No. 7. I will put

(Testimony of Leslie K. Loehr.)

this up here so your Honor can see this easier. You will see I want to adjust this.

The Court: Tell me, first of all, is the tappet loose now?

A. Oh, yes; the tappet is loose. And I desire to adjust this down to the lower end of the scale here. By applying pressure to that lever here, I have moved my adjustment.

Q. In other words, you find an angular displacement of the rotor?

A. An angular displacement of the rotor by virtue of pressure applied to the shaft during the process of adjustment.

Q. Isn't that due to the way that that is balanced on there?

A. No. That tappet is in the same relative position [591] as shown in Figure 14. The reason for the movement, of course, is not quite obvious from the drawing.

Q. The general principles are the same, aren't they?

A. The fact that this is used to position the rocker to a definite place when it is locked is the same, that much of it. In other words, we have a tappet which co-acts with the rocker to bring it back to the same position as I am doing here.

Q. What about the coaxiality of this?

A. That is not coaxial, your Honor. And, when I wish to adjust this down to the lower end of the dial or either end of the dial, pressure on that lever moves that out of adjustment.

(Testimony of Leslie K. Loehr.)

Q. (By Mr. Flam): Will you demonstrate that same mode of operation with the Leishman lever?

The Court: I see it.

Q. Due to the fact this is coaxial, it stays in place?
A. That is right.

Q. And the fact that this is not coaxial causes a movement there, as quick as you touch it, that throws it out of balance?
A. That is right.

The Court: All right.

Q. (By Mr. Flam): At which end of the adjustment of [592] does this failure of setting occur in the use of the Marschalk device?

A. It will occur at either extreme end.

The Court: Suppose I wanted to see it at, we will say, 700, what about it then?

A. At 700 or near the center, where the rocker is nearly horizontal, the effect of that displacement is not as great as it is at the ends.

Q. What if I wanted to set it at say 1700?

A. Setting it at 1700, with pressure applied on the lever, you have to be very delicate about your pressure if you wish to keep it in that position.

Q. Does the weight on there have anything to do with it?

A. The weight is to retract the tappet out of interference with the rocker.

Q. In other words, the plaintiff's invention here over the Marschalk invention is more accurate and positive?

(Testimony of Leslie K. Loehr.)

A. That is right; more accurate and positive and more fool-proof, let us say, because pressure on the lever which is used to——

Q. Mechanically it works better?

A. That is right.

The Court: All right.

Q. (By Mr. Flam): Not only does it work better but is [593] it possible with the Marschalk device to adjust the rocker to a desired position in as simple a manner as would be possible in connection with the Leishman tuner?

A. Well, of course, in the Leishman tuner you have one button with one thumb screw to adjust, whereas, in the Marschalk device your thumb screw for adjusting the tappet is located probably inside the set.

The Court: There is no claim of invention on the adjustment end of it, is there? You don't make any claim on that, do you? I say that because in the patent in dispute it is a lever that is being used and the accused device is a push button type. There is no general similarity in the method of adjusting these upon which you are basing a claim, is there?

Mr. Flam: Not the general mode of adjustment.

The Court: As I understand, your claim resolves itself down to three features, the tappet, the rocker and the coaxial position.

Mr. Flam: That at least is the sense of at least one or two of these claims in issue. There are

(Testimony of Leslie K. Loehr.)

other ways of trying to define the invention, though.

The Court: I have read those claims and it is easier for me to try to work out a crossword puzzle. I am trying in my own mind to resolve those down into a simple formula that I can fix in my own mind. I can't fix in my own mind the wording [594] of each one of those claims but I am trying to ascertain exactly that which the plaintiff claims. As I understand his testimony, it is a combination of a tappet, a rocker and a coaxial position that distinguishes this from other automatic tuners.

Mr. Flam: I think that will be a fairly acceptable definition without going into very many technicalities. I think the essence is probably there. The matter of the interpretation of the claim, of course, is something I would like to go into.

The Court: I understand. I am just trying to clarify my thoughts as we go along if such a thing is possible.

Mr. Flam: Before I go on with the testimony, I offer in evidence this lever marked for identification as Plaintiff's Exhibit No. 23. And I offer in evidence this chart that the witness has been using to help him in testifying.

The Court: Is there any objection?

Mr. L. S. Lyon: I couldn't hear what you said at the last.

The Court: He is offering the chart as an exhibit, explanatory of the witness' testimony.

(Testimony of Leslie K. Loehr.)

Mr. L. S. Lyon: No, your Honor.

The Court: All right; admitted as the next exhibit in order.

The Clerk: Plaintiff's Exhibit No. 24. [595]

Q. (By Mr. Flam): Can you explain more clearly perhaps than you have before—or before I go into that, I have here a chassis of a radio set. Do you know what that is?

A. I believe that is a small Crosley radio that came out of that cabinet.

Q. The cabinet I have in my hand?

A. The cabinet you have in your hand; yes.

Q. Do you know anything about its structure?

A. The push button tuning mechanism that is on here is similar in structure to that shown in other Crosley devices, for instance, Exhibit No. 10.

Q. There is a push button there that is different, though. Will you explain to the court what it is?

A. Yes; there is one push button that has been altered.

The Court: Who did that?

A. That was done at the request of Mr. Leishman.

Q. In other words, it has been changed here for experimental purposes?

A. For experimental purposes, to show the effect of the non-coaxial feature. In other words, a little plate has been added to the treadle bar so that the surface of that plate is above the axis of rotation of the treadle bar. That portion of the tappet or

(Testimony of Leslie K. Loehr.)

of the plunger, I should say, which originally passed through and now has been extended on [596] the outside for a guide is used then in demonstrating the principle of the off-center——

Q. Wait a minute now. It comes up in place, doesn't it?

A. Yes. The cam is locked. By removing this——

Mr. Flam: Before you go much further, I would rather have a tag put on that so we can refer to it for identification.

The Clerk: Plaintiff's Exhibit No. 25 for identification.

The Court: You gentlemen are finally getting around to the point where you are demonstrating the thing I was asking about yesterday.

Mr. Flam: What we are trying to do, of course, is to show the importance of this coaxial feature.

The Court: Or unimportance.

Mr. Flam: That is the other side's job.

The Court: It looks to me like you are making a good demonstration right there.

Q. (By Mr. Flam): Will you go ahead and explain that special push button?

A. Yes. On Exhibit No. 25 I will adjust the tappet for tuning in a particular station at the end of the dial where the difficulty is most serious. By inserting a screw-driver in the aperture of the push button, I loosen the adjusting [597] screw and I set the dial into an extreme position and bring

(Testimony of Leslie K. Loehr.)

the lever down in contact, that is, the push button down in contact, so that the——

Q. Where is the pointer now?

A. We set the pointer at about 1800. And, by applying pressure on the screw to hold the tappet in contact with the rocker, I have moved the rotor out of position so that it is not in the place I desired it. We set it at 1800, yet, when we push this button, it brings it back. You have to exert exceptional diligence in the setting of that. I mean, if you have applied sufficient pressure to your screw during the process of adjustment, it would have moved out of adjustment.

The Court: There it is. If I had used a sledge hammer on it, I would have knocked it to pieces.

A. That is true. But in a device built according to Leishman's teachings considerable pressure can be applied on the screw-driver without in any way affecting the adjustment. Moving the dial to its extreme ends, the seriousness of that situation prevails at the extreme ends of the movement where, particularly on one end, the stations are bunched closest together. You can push as hard as you want on that.

Q. (By Mr. Flam): This is one of the unaltered levers?

A. This is one of the unaltered levers and one with the coaxial feature and you don't disturb the setting of the [598] radio set or of the tuning, I should say.

(Testimony of Leslie K. Loehr.)

The Court: Will you explain to me the difference in the way that sets and comes in contact with the rocker by reason of the change?

Q. (By Mr. Flam): Can you do that in connection with this chart?

A. Yes; I can do that better in connection with the chart that has been prepared.

The Court: All right.

A. This chart at the top, of course, is the co-axial arrangement in which the tappet is brought in contact with the rocker; and a line drawn from that point of contact on each side toward the center gives us a lever arm of the same length. In the case of the non-coaxial feature we have lever arms of different lengths and a line drawn from the point of contact of the tappet with the rocker on the left-hand side is shorter than a line drawn from the point of contact of the tappet with the rocker on the right-hand side to the center of the rocker. In other words, we have a force moving the tappet downward and that force will be equally distributed between the lobes of the tappet, but, since one lever arm is longer on one side than on the other, with an equal pressure it reminds you——

The Court: An equal pressure on one side over the other? [599]

A. Yes. It is like children on a teeter-totter. If you put two of them on there of the same weight, the teeter will totter. If you move one of them toward the center, the teeter-totter will move

(Testimony of Leslie K. Loehr.)

down on that end where the child is farthest from the center.

Q. Well, it is not necessary to take up time explaining a teeter-totter.

A. What I wished to compare was the distribution of the weight above the center.

Q. I still can't see, from examining these, where there is any difference in the——

A. When they are both locked?

Q. Well, this one is loose or they are both loose.

A. Press hard on it and it moves. Now, we move it to the other direction and now press hard on it. In other words, if you set this at a particular station on the dial, then, when that pressure is exerted, it will tend to move that rocker out of position. And on that particular end of the dial where the stations are bunched the closest together the slightest movement of that is sufficient to detune the set.

The Court: I think, gentlemen, we will take our afternoon recess at this time for five minutes.

(Short recess.)

Q. (By Mr. Flam): In connection with this Plaintiffs' [600] Exhibit No. 25, when you try to adjust the tappet or striker cam, when the adjustment is for some position near the intermediate position of the ends, is the fact that the tappet or striker cam and the rocker are not in coaxial alignment as important as when an attempt is made to

(Testimony of Leslie K. Loehr.)

adjust the position of the tappet for a station that is tuned in at either extreme position of the knob?

A. At the intermediate position of the rocker the difficulty of the non-coaxial feature is not nearly as serious as it is at the ends of the dial or at the extreme angular position, let us say, of the rocker. There is where the angular position becomes the greatest difficulty.

Q. Well, would it be possible by exercising great care to adjust the position of the rocker—of the tappet, rather, even at the extreme positions of the rocker?

A. Yes; it is possible to adjust it at the extreme positions, but without applying pressure to the screw or to the push button you are never certain that that tappet is in contact with the rocker therefore you are not sure of your setting and the slightest displacement of that will detune the set.

The Court: It is all right for you to go ahead with this so far as your record is concerned. The court has tried the instrument and the witness' testimony does not add anything to what the court has already ascertained from an [601] examination and an effort on its part to work the mechanical device. I had no difficulty in setting the device at the extreme end, but it is true that a person has to use a greater amount of care. That was the result of the court's own experiment with the instrument.

The Witness: Of course, this amount of off-center here is not as great as——

(Testimony of Leslie K. Loehr.)

The Court: I can understand the reason why. That has been gone into and explained.

Q. (By Mr. Flam): Why is it important to have the rocker most accurately adjusted, or rather, the tappet most accurately adjusted at the extreme positions of the rocker? Will you explain that in connection with the chart?

A. Well, I have here a chart which illustrates a rocker operatively connected to a condenser and a line drawn through the rocker pointing to a scale at the right and a line drawn through the center of the gear on the condenser pointing to a scale toward the right. A very slight angular displacement of the rocker will throw the adjustment out as much as 300 points.

The Court: That is the old principle of a lever?

A. That is right.

Q. A crowbar principle?

A. That is right. But, you see, the point is that, [602] regardless where this may be, it has thrown it out that far and whether it is over here or——

Q. It is necessary to be accurate?

A. That is right. It is necessary to accurately adjust the set.

Q. How about these new arrangements that, through the magnetic control, bring these in place; to what extent will they compensate with that?

A. I am not familiar with magnetic control radio tuners.

(Testimony of Leslie K. Loehr.)

Q. (By Mr. Flam): When any material pressure is applied to the push button associated with the non-coaxial tappet, if I may express it that way, in Exhibit 25 for identification——

A. Yes.

Q. ——did you note off-tuning movement of the set comparable with that shown on the diagram you now have in your hand?

A. Yes; I have. By mounting this set and applying pressure against the screw during the process of adjustment in the extreme position it very easily throws it out 300 points. I am demonstrating now, showing how that movement causes the rocker to rotate out of position.

Q. At the end of the scale or end of the dial where the frequency is up around 1700, or 1500 or 1600 kilocycles, are the movements—or how important, rather, is it to set [603] the dial to an exact figure?

A. Radio sets are so sharp in their tuning now that the slightest movement, even of a hair's breadth off the pointer, will detune the radio. They are very keen, so any movement at all, regardless of how little, is sufficient to affect the setting of the adjustment.

The Court: May I ask this question: In using the push button here where you sealed or have covered up the hole in the rocker so as to demonstrate the machine without the use of the coaxial movement——

A. Yes.

(Testimony of Leslie K. Loehr.)

Q. —does the extent that the gadget here——

A. You mean the tappet?

Q. —the tappet above the rocker, does that have any effect on the extent to which there will be a variation?

A. Oh, yes. If the center is moved up farther, why, of course, your difference will be——

Q. Would the fact that you have a copper plate on here of some thickness, would that have any effect on the degree of accuracy?

A. Yes. That is an attempt to bring the surface of the rocker above the axis of the——

Q. So that the height that the axis is above the rocker the greater will be the variation?

A. You mean the greater the surface is, or the greater [604] the difference between the surface and the axis——

Q. Yes.

A. —the greater will be the variation?

Q. Yes. A. Yes; that is right.

The Court: All right.

Mr. Flam: I want to offer this Crosley set, Plaintiff's Exhibit 25 for identification, into evidence. I want to offer the second chart into evidence.

The Court: Admitted in order.

The Clerk: Exhibit 26.

Mr. Flam: Also the third chart.

The Clerk: 27.

Q. (By Mr. Flam): As far as the off-center effect of the brass plate on the Crosley set, Exhibit

(Testimony of Leslie K. Loehr.)

25, and the effect and the extent of the off-center of the Marschalk lever, Plaintiff's Exhibit No. 23, do you know whether the extent that the tappet in the Crosley set was made non-coaxial with respect to this Marschalk lever—in other words, are they off-center about the same amount in both devices? Do you want to examine this set?

A. Yes; I would like to examine that other set before answering that.

The Court: There is a difference between the thickness of that metal, isn't there? [605]

A. Yes; there is a difference between the thickness of that. That is why I want to examine it. I would say that the off-center distance is substantially the same. There might be a slight variation.

The Court: May I ask one more question that occurs to me? A. Yes, sir.

Q. May I take your screw-driver?

A. Yes, sir.

Q. Would the place that the pivot is placed in the—what do you call this? A. The tappet.

Q. —in the tappet have any effect upon that?

A. Yes.

Q. In other words, could not the position of the tappet be changed so that it would be more accurate, or, that is, more stationary?

A. As you bring the pivot point down close to the line of contact you get greater accuracy but you get greater difficulties because of mechanical features. Your rivet becomes smaller and your pivot becomes smaller.

(Testimony of Leslie K. Loehr.)

Q. I know, but at the present time that pivot is apparently placed in about the center.

A. Well, you mean in the thickness of the large hub, let us say, to the bottom? [606]

Q. Across the bottom of that is about the center, is it not?

A. Oh, yes. It is equidistant from each end; yes.

Q. Well, that would be the center, wouldn't it?

A. Well, that is the center in that respect, yes.

Q. The middle, then, of the lower part?

A. All right, the middle, then.

Q. The placing of that pivot in any other position—could it be placed in any other position that would change the degree of accuracy?

A. Yes. If it were off center it would be less accurate.

Q. It would be less accurate? A. Yes.

Q. All right.

A. In other words, the pivot pin is normally in line with the axis of the rocker. That is a vertical line.

Q. (By Mr. Flam): Have you made any survey recently as to the push buttons or mechanical tuner mechanisms that have been offered on the market?

A. Some months ago I made an investigation of several retail stores to find out what the type of radio was being offered for sale and the type of tuner used thereon.

(Testimony of Leslie K. Loehr.)

Q. Did you have an opportunity of seeing a good many dozens of sets and of makes? [607]

A. Yes; I examined quite a number of them and found that——

The Court: What do you mean by “quite a number”?

A. Well, let us say about 8 different models, that is, manufactured by 8 different companies, or something like that.

Q. Here in the City of Los Angeles?

A. Here in the city. Well, they were offered for sale here in the city. I don't know that they were all made here.

Q. Well, I mean the retail market in the City of Los Angeles? A. Right.

Q. (By Mr. Flam): Did you find a single one of them that incorporated a tuner mechanism such as that shown in the Marschalk patent?

Mr. L. S. Lyon: If your Honor please, that would not even be acceptable for the purpose of a Gallup poll. He only samples 8 different——

The Court: The Gallup poll has been reading all right to me.

Mr. L. S. Lyon: What?

The Court: The Gallup poll has been reading all right to me.

Mr. L. S. Lyon: He only took a sample of 8 different [608] sets out of the hundreds that are made, and you could not draw any conclusion from looking at 8 sets.

(Testimony of Leslie K. Loehr.)

Mr. Flam: I do not think he said 8 sets. He said 8 manufacturers.

Q. Is that right? A. That is right.

Mr. L. S. Lyon: How many manufacturers of radios are there?

The Court: I think that is a matter for cross-examination as to the weight of his testimony, Mr. Lyon.

Mr. L. S. Lyon: He wants to draw an inference, I think.

Q. (By Mr. Flam): Will you answer now?

The Witness: Will the reporter please read that question?

(Question read by the reporter.)

A. No; I found no tuner mechanisms that used any device similar to Marschalk's device.

The Court: You found tappets, did you?

A. Oh, yes; plenty of tappets.

Q. And rockers?

A. Plenty of rockers displaced coaxially.

Mr. L. S. Lyon: If your Honor please, the Marschalk patent is for use on a radio, a timed radio. It has an automatic timer on it. I wonder if this witness bothered [609] to go look at any of this kind. Was he looking for Marschalk's device or some other kind?

The Court: That you can bring out on cross-examination, Mr. Lyon.

Mr. L. S. Lyon: To me, the testimony is so re-

(Testimony of Leslie K. Loehr.)

mote that I should hardly have to cross-examine on it.

The Court: Well, you will.

Q. (By Mr. Flam): I think some testimony has been offered here regarding the equivalents of lever and push button for moving the tappet into position for tuning a set mechanically. Can you state whether a lever mechanism is the mechanical equivalent of a push button mechanism of this arrangement?

Mr. L. S. Lyon: I object to that as calling for a legal conclusion from the witness. He has not laid the foundation at all for the proof any equivalency. The witness can't just usurp the functions of the court.

The Court: I will let him answer for what it is worth and we will still see.

A. Yes. A push lever is—or, rather, a push rod is used very often for the same function as a lever. The object of controlling any body that is moving in space is usually to define its magnitude and direction of its movement. Whether or not that would be by a lever or a plunger makes little difference; both constrain the direction. [610]

Q. (By Mr. Flam): I will show you page 2019 of Knight's Mechanical Dictionary, Volume III, having a notice on it "Published by Hurd and Houghton, 1877."

Mr. L. S. Lyon: I didn't get that answer. Did that witness say that if you just pushed with a

(Testimony of Leslie K. Loehr.)

crowbar you would get the same effect as if you used it as a lever?

Mr. Flam: Will you read the answer?

(Answer read by the reporter.)

Q. (By Mr. Flam): Do you find anything in this volume of the Mechanical Dictionary which substantiates your statement?

Mr. L. S. Lyon: I object to that, your Honor. A witness can't lift himself up by referring to authorities to support his statement. He can rely on his qualifications. You can confront an expert witness on cross-examination with contradictory statements from other authorities; but a man can't prove his own statement by reference to other authorities. He has to prove it by his oath and his own qualifications.

Mr. Flam: Of course, you have a right to ask him upon what sources he has drawn for conclusions made by him.

The Court: I will admit it.

A. Well, on page 2019 of this dictionary published in 1877 is poppet valves, Figure D, and Figure G. Reading from the description: D is a "common safety-valve with graduated lever, on which the weight may be set at any required [611] number of pounds' pressure."

Reading the description of G, we find that "the weight is attached to a stem projecting downwardly into the boiler."

Q. (By Mr. Flam): What about Figure F?

(Testimony of Leslie K. Loehr.)

A. Figure F shows "a series of removable perforated weights on the valve-spindle are employed," with weights on top, showing that as early as 1877 the force of the weight was exerted directly over the valve or by means of a lever.

Q. Are there any other instances that would show the equivalents of these two types of mechanisms?

The Court: I think we have had enough of that, Mr. Flam.

Mr. Flam: I have a photostatic copy of the title page and page 2019 of Knights' Mechanical Dictionary. In order to be illustrative of this witness' testimony I am offering the photostatic copy in evidence.

Mr. L. S. Lyon: The same objection.

The Court: Admitted.

The Clerk: Exhibit 28.

Q. (By Mr. Flam): When you examined these radio sets about which you have testified, some months ago, did any of them incorporate the tappet and rocker in which the tappet and rocker were not coaxial in the tuned-in position?

A. No. All the mechanical radio sets that are used in push-button tuning the tappet was coaxial with the treadle [612] bar, or substantially so.

The Court: You mean that you examined?

A. That I examined; yes.

Q. (By Mr. Flam): What proportion of the tuners that you saw employed a treadle bar or

(Testimony of Leslie K. Loehr.)

rocker such as we have been talking about?

A. All of them.

Q. Well, they did not all employ—didn't some of them have other types of tuners?

A. No. I mean with reference to the mechanical tuner of the push-button type. Yes; some of them had types of tuners. Yes; surely there were electrical push-button types which, of course, did not employ the treadle bar. They were switches, I understood.

Mr. Flam: You may cross-examine.

Cross-Examination

By Mr. L. S. Lyon:

Q. Are you particularly versed in the radio art? I mean, is that your field?

A. No. I am a machine designer.

Q. Have you noticed that usually you can tune a radio more sharply with an automatic tuner than you can tuning it manually to your ear? Has that been your experience?

The Court: What was that question?

(Question read by the reporter.)

A. Well, I don't quite see how that could be because [613] to adjust the tuner in the beginning would depend upon your——

The Court: Answer the question, answer the question. A. Well, no.

Q. (By Mr. Lyon): That has not been your experience? A. No.

(Testimony of Leslie K. Loehr.)

Q. You think you can tune them more efficiently, bring in the station more sharply, doing it manually to your ear than you can relying on the automatic tuning that the manufacturer has put in the device?

A. Well, I don't quite understand that question. I mean you have to adjust your radio sets in the beginning and that usually is done with your ear.

Q. Is it always? A. As far as I know.

Q. Well, do you know?

A. No; I don't know definitely that everybody adjusts a radio with their ear.

Q. Do you know whether or not it is the practice to set these automatic tuners by your ear or by some other method?

A. Well, from my experience, I believe you set it with your ear.

Q. Have you had any experience? [614]

A. Yes; setting a few radio sets.

Q. You have not been in that business?

A. Oh, no; I haven't been in that business.

Q. Have you had any opportunity to see how the manufacturers set these tuners?

A. No; I haven't.

Q. Then, you don't know how they are set at the factory. But I am asking you, just you check——

A. I don't know that they are set at the factory, even.

Q. Have you seen one of these sets like there is on so many automobiles, where there are a certain

(Testimony of Leslie K. Loehr.)

number of buttons for automatic tuning and then a switch that allows you to throw over to manual tuning?

A. Yes; I have seen some; in fact, a friend of mine has one on his automobile.

Q. Have you noticed whether or not he gets sharp tuning with the buttons, with the automatic buttons?

A. Well, I believe you are referring there to those electrical buttons rather than mechanical buttons, are you not?

Q. What about the electrical buttons? Let us talk about those. They give you a sharper tuning than you can get by manual tuning to your ear, do they not? A. I don't know.

Q. Have you made any comparison of that kind? [615] A. Not definitely; no.

Q. This matter of what you call coaxiality, another term for that is on-center. I think Mr. Flam used that. Do you understand that? Would you say that was a synonymous term?

A. Used perhaps to describe the action of the tappets or the center of the tappet with respect to the center of the rocker, you might say that they were on-center if they were coaxial. If that is what you mean?

Q. Yes. If those two axes are in alignment, why, they are on-center; if they are in any misalignment, why, they are off-center, are they not?

A. Yes; in that sense they would be off-center.

(Testimony of Leslie K. Loehr.)

Q. And you, as a machine designer, you know, do you not, that it is part of your profession to see that centers are in alignments in mechanical designs? When a misalignment produces any difficulty in the operation of the device you set the machine, as part of your profession as a machine designer, to study and analyze the design to see that those misalignments are avoided; isn't that correct?

A. That is right.

Q. That is your profession, really, to see——

A. Well, machine design, not studying to see that things are on-center, no; but machine design is my business.

Q. Yes. As a machine designer one of the things [616] a machine designer does is to watch things to see that things that ought to be on-center are on-center in his design?

A. That is correct.

Q. Whenever you have two members that you want to turn together in the same orbit or to maintain contact with each other as they are turning together, you know that they should be on-center, isn't that correct?

A. Well, they may be coacting in such a way that the resultant would be a center.

Q. The resultant; either they are actually on-center or the resultant amounts to the same thing; isn't that correct?

A. Yes; so they will function together.

Q. In other words, this matter of putting these

(Testimony of Leslie K. Loehr.)

members on-center is one of the common tools and one of the common experiences of a machine designer.

A. Yes. If you have reference to machine elements in a machine; yes.

Q. Let us take it as simple as the hands of a watch. You want the hour hand and the minute hand, say, to turn together; if you wanted them to turn together and stay together you would know that they had to have a common pivot, would you not, or a common axis?

A. If you want the two hands to be together and rotate [617] about the same axis, of course it would be necessary to impose one over the other.

The Court: They would have to, wouldn't they, if you are going to have a watch?

A. Yes. And, you see, your Honor, perhaps during the early development of watches——

The Court: The only reason I am asking that question is that it seems to me you are, in a sense, avoiding answering his question.

A. Well, I don't mean to.

The Court: Without giving a clean-cut direct answer. You are hedging a little bit.

The Witness: Well, I don't mean to hedge about it because his statement is correct. You have to have the centers.

The Court: Let us get down to it.

Q. (By Mr. L. S. Lyon): If the center of those two watch hands were off-center the watch could not keep time, could it?

(Testimony of Leslie K. Loehr.)

A. No; there would be interference of the rotation on the one hand.

Q. And wherever in a mechanical design you have two members that are to turn together or rotate together, as a mechanical designer you must see that they are on-center? A. That is right.

Q. Or sooner or later somewhere in the operation they are going to clash; isn't that correct?

A. That is right; yes.

Q. Now, isn't that what happens in this tappet on this rocker, just the same thing?

A. No; not exactly, because, you see, you are moving the one element in position to actuate the other just a little bit different than in a watch, let us say, where the hands are disposed that way permanently. This is not a permanent disposition of those two pieces. Only when they are pushed into contact does that prevail.

Q. Yes. But the only time that they set up any unbalanced forces or cause any interference is when they are in contact; that is correct, isn't it?

A. That is right.

Q. So the principle is really the same, isn't it? The principle is that you desire those two parts, the tappet and the rocker, to turn together, so you want them to be on-center; isn't that the principle?

A. Yes; that is the principle.

Q. Now, you have said that a lever and push button are equivalents. Are you answering in a legal sense or in what sense are you answering?

(Testimony of Leslie K. Loehr.)

A. Well, I am answering in the sense that, as disclosed on the chart, the thing that we are essentially concerned [619] with is the movement imparted to the tappet as it approaches the rocker. Now, what you desire to do is to control the direction of that movement and the amount.

Q. Then, you think anything that will accomplish that result is an equivalent?

A. As far as movement of that tappet is concerned, I certainly do.

Q. Then, your definition of an equivalent may be different from mine. A. That may be.

Q. Perhaps you had better tell us, if you can, how you define an equivalent in the sense that you have used it in your testimony.

A. In the sense that I have used it, I think I have already explained that, as far as the tappet is concerned, what you desire is the control of the direction of the movement of that tappet with the lever, either control its direction by the movement of the lever about the shaft Q on the push rod, the guides, and control the direction of that push rod so that it reaches the—so that the tappet reaches the rocker and that their axes coincide.

Q. Is there any similiarity in that use or comparative use of a lever and a push rod between those two, except that they both perform this same function that you have described? [620]

A. That is the only place where they are similar because that is all you are concerned with.

(Testimony of Leslie K. Loehr.)

Q. Otherwise, their own method of accomplishing that function, and their own form, etc., may be entirely different?

A. The fact remains, however, that——

Q. Well, can you answer that?

The Witness: Please read the question again.

(The question was read by the reporter.)

A. The form of the levers may be different; oh, yes.

Q. Have you given any consideration to whether or not you would regard the two bars, the two inter-related bars actuated by the tappet in this Zenith device, would be the equivalent of a rocker?

A. In the respect that they impart rotary motion to a condenser.

Q. In the respect that they perform the same function they are equivalents, are they not?

A. Mechanically, no. No; they are not equivalents in that respect. I mean that they do transmit motion to the condenser shaft.

Q. Those two bars, these two inter-related bars in the Zenith device, perform the same function in that device that the rocker does in Mr. Leishman's patent, do they not?

A. That is right. They rotate the condenser.

Q. And in that sense they are equivalents, are they not?

A. Yes; they are equivalents in that sense and they both of them rotate in the condenser.

Q. In the same sense that you have compared

(Testimony of Leslie K. Loehr.)

a lever and a push button a moment ago as equivalents, these two bars are the equivalent of a rocker, isn't that true?

A. Well, no. There is a little bit of difference there. You have given linear displacement to a member; whereas, in this position you have given rotation to a member.

Q. Well, I understand that. But these bars are the equivalent of the rocker in that they perform the same function, and in that sense they are equivalent for the same reason that you said a lever and a push button was equivalent a moment ago?

A. They rotate the condenser, if that is what you mean.

Q. Can't you answer that question just definitely? A. That is exactly what I said.

Q. Or else deny it?

A. No; I can't answer that question without an explanation due.

Q. I notice in your chart, Exhibit No. 24, you have omitted or dropped off part of the plunger in those [622] illustrations of the defendant's plunger. Did you do that on purpose?

A. Well, we are willing to concede that the guide that extends on through for guiding that plunger travels the same as it does in the case exactly.

Q. Is not that the real reason for that portion—is not that the real reason for extending those

(Testimony of Leslie K. Loehr.)

plungers through the rocker plate in the defendant's device, so as to continue down to get a bottom bearing for the plungers?

A. No; I don't think it is the real reason in the defendant's device.

Q. Are you sure of that?

A. Well, that may be their reason but it still remains that the axes of the tappet—or the axis, rather, I should say, of the rocker coincide when they are in the operative position.

Q. You would say it would be a pretty poor design, as a designer, if they did not have those centers aligned, wouldn't you?

A. Well, here is a demonstration——

Q. Answer that yes or no, as a designer, if they did not have?

A. Yes; you have got to align the plunger.

Q. No. I am saying this: If you examined a tuner like the defendant's and found that there was any such [623] discrepancy as you pointed out in that model here, where you had disturbed the coaxiality, it would be apparent to you at once that the trouble was that you did not have the centers on center; and you would say that it was a poor design from the standpoint of an ordinary designing job, wouldn't you?

A. No; I am not sure that I would.

Q. Well, are you sure that you would not?

A. No; I am not sure that I would not. It would require some study, even this.

(Testimony of Leslie K. Loehr.)

Q. You give study every day, as a designer——

A. That is right.

Q. ——to check up on concentricity and alignments and things being on center?

A. That is right.

Q. That is your business as a designer?

A. That is right.

Q. And you could check that out of that device without much trouble, couldn't you, if you saw any such difficulty as you have been exhibiting here? A. Well, I might.

Q. Now let me have that device just for a minute. We are referring to Exhibit No. 25. When you came to substituting a different tappet here at this end push button you took the trouble of putting on some kind of an addition [624] here. What did you do that for?

A. That is a guide for the plunger.

Q. What did you want that on there for?

A. I just explained to you a minute ago that you had to guide the direction of that tappet.

Q. Why?

A. In order that it can approach the center or the axis of the tappet can approach the axis of the rocker.

Q. In other words, in the defendant's device it is necessary that there be a bearing below the rocker for the plunger as well as a bearing above the rocker, is it not?

A. No. No; I can put a guide up here.

(Testimony of Leslie K. Loehr.)

Q. Well, you have to have a guide somewhere, don't you?

A. Oh, yes. Yes; you have to have a guide.

Q. And the correct place is to have it at both ends of the plunger, isn't it, from a designing standpoint?

A. No; not necessarily.

Q. The convenient place, at least, where he puts it. But you could not just put a push button on here on a plunger and a tappet on there and not have any guide for it?

A. That is right. That is what it is there for.

Q. Is there any guide in the plaintiff's patent here in his drawing? Has he got any guide at all?

A. The effect of the guide is the arm rotating about the shaft.

Q. In other words, the plaintiff's reissue patent design here for guiding his tappet depends on mounting it on a shaft Q and rotating the tappet about that shaft by means of the lever?

A. Rotating the lever about the shaft, yes, which carried the tappet.

The Court: Now, let me get the point.

Q. Do I understand that the effect of this bar, which I believe in the patent is described as Q, serves the place of a guide that is used on the push button?

A. Yes. You see, your Honor, it constrains the movement about that point, about that axis.

Q. It definitely positions it?

A. Yes; or definitely positions it.

(Testimony of Leslie K. Loehr.)

Q. There is a definite axis there so it will go right back to the same place each time?

A. That is right.

Q. (By Mr. L. S. Lyon): Then, there is more to this question of changing from a lever type to a push button type than just merely the difference between a lever and a push button. You have also got to give consideration to a different way of guiding a push button from the way that the plaintiff shows of guiding a lever; isn't that correct?

A. Well, the mere fact that they are guided, is that what you mean?

The Court: Well, just a moment now.

Q. Under the plaintiff's patent here there was a guide because it was tied into an axle there that in the patent that is described as Q?

A. That is right.

Q. And that guides the lever so that when the tappet comes down it hits exactly the same place on the rocker every time?

A. That is right.

Q. All right. Now, when you eliminate Q or the tie-in to Q and want that tappet to hit exactly the same spot in the rocker every time, you have to have something as a guide?

A. That is right. You substitute something for Q.

Q. So that in the change from a lever to a push button style you have to have a guide for that push button that takes the place of the anchor to which the lever was fastened before?

A. It takes the place of Q; yes.

(Testimony of Leslie K. Loehr.)

The Court: That was the point, was it not?

Mr. L. S. Lyon: That is right.

A. That is right.

Q. And in the defendant's design, why, the defendant [627] has its push button plunger and he has provided a guide above the rocker and a guide below the rocker. You notice that, do you not?

A. Yes; depending upon whether it is horizontal or vertical.

Q. And in all these various other tuners that have apparently been placed on the market since the defendant's design was first put on the market for sale you have noticed that, have you not?

A. With the exception of—

Q. 20? A. 17, in which the guide is above.

Q. Yes.

The Court: 17, is that the other invention of the plaintiff?

Mr. Flam: No.

Mr. L. S. Lyon: No. This is this device which you stated looked like a cradle.

A. I might also add that in Exhibit 20 they have gone around the side for the guide.

Q. But they are above and below.

The Court: Then the main point is they have guides? A. That is right; they have guides.

Q. Whether they are up above or where they are, they have [628] to be guided if it is not tied into an axis? A. Like on a lever.

Q. Like on a lever? A. That is right.

(Testimony of Leslie K. Loehr.)

Q. (By Mr. L. S. Lyon): And the defendant's plunger is made to extend through the rocker so that he can get that guide below the rocker; that is correct?

A. That is right. Yes; that is right.

Q. And you have not attempted to show in your comparison on this Exhibit 24 the bottom guide or the fact that the plunger extends through the plate for the purpose of acting with the bottom guide, have you?

A. The chart does not show it, but from the practical point of view we are willing to concede that that guide does extend below. I mean we are moving that, we are illustrating a force, rather. It is schematic.

Mr. L. S. Lyon: That is all, thank you.

Redirect Examination

By Mr. Flam:

Q. In making the adjustment of sets utilizing mechanical tuners, isn't it a fact that you wish to tune the set into a different set of stations, depending upon where you happen to be using the set?

A. If you mean the locality?

Q. Yes. A. Yes, indeed. [629]

Q. In other words, if you were in the eastern part of the United States——

The Court: You do not have to go as far as the east. I drove up to Portland this last summer

(Testimony of Leslie K. Loehr.)

and I know that we had trouble and had to abandon our tuning device; so the court will take judicial knowledge of that. If it is not judicial knowledge, it will take actual knowledge from experience. It is one of the experiences of life that we are all enjoying these days.

Q. (By Mr. Flam): On that basis would it be possible to set radio sets in the factory for use indiscriminately all over the country? A. No.

Mr. Flam: That is all.

Mr. Flam: We have been talking about these disclaimers and I would like to offer in evidence certified copies of two disclaimers filed in connection with the reissue patent in suit.

The Court: They may be admitted.

The Clerk: Plaintiff's Exhibits 29 and 30.

Mr. Flam: Also, since the reissue patent is a division of a prior application, and in order to complete the record, I will offer a copy of Leishman Patent No. 2,084,851, of which the reissue application is a division.

The Court: That is the 1934 patent, [630] is it?

Mr. Flam: That is the patent that was applied for December 15, 1934. It shows other forms of tuners that are attempted to be protected by the claims of that patent.

Mr. L. S. Lyon: Of course, that offer does not really show what was in that application at the time that the parent of the original application was issued, upon which the reissue patent in suit

was granted, because that is what the patent issued on, what was left of that original application.

The Court: He says it completes the record.

Mr. L. S. Lyon: I don't think I have any objection to it, but I don't think it establishes the point Mr. Flam says he wants to establish.

Mr. Flam: We may have to offer in evidence a complete file wrapper of that original case. On doing that, of course, this exhibit may be withdrawn.

Your Honor, I didn't think we would finish quite so soon. We expect to be here with another witness tomorrow morning.

The Clerk: Do I understand that last exhibit is admitted?

The Court: Admitted.

The Clerk: Plaintiff's Exhibit No. 31.

The Court: How long is it going to take you to finish?

Mr. Flam: I think we can finish in about an hour tomorrow. [631]

Mr. Flam: Of course I subscribe to the proposition that the differences between the two records should be under consideration by your Honor, but I don't want the testimony to be taken as binding upon the defendant in this action.

I think it is entirely proper for your Honor to read the entire record and I suppose it is available to your Honor, to see what actually there is in the way of testimony between the two cases—whether there is any justification for your Honor

to come to a different conclusion, as we hope your Honor will.

In that connection, in order to be fully apprised of what happened in that case, the plaintiff in this action has filed briefs in the Circuit Court of Appeals in the Associated Wholesale Electric case. There is a great deal of reading matter there and I would like to give it to your Honor without offering it in evidence if there is no objection by the other side.

And also in connection with the recently decided case in the Ninth Circuit, No. 11652, I have a copy of a petition for rehearing. I think a copy has been served on Mr. Lyon. That may throw some light upon our basis for it being an incorrect interpretation of the law or the rule relating to summary judgment.

The Court: Of course I was going to read all that I feel is necessary to read and that is going to be a good deal. [632] We will receive this without ruling on the objections made at this time unless further investigation should indicate differently.

I would like to be able to bring about my own solution of the case. The objection will be noted and the matter may be discussed further if found to be appropriate, in the briefs of counsel.

Mr. Lyon: Plaintiff rests, your Honor.

Mr. Flam: If your Honor please, there are some exhibits I find that have been marked for identification and not formally offered in evidence. I want to offer them now. Exhibit V, consisting

of page 21 of the June, 1937, Radio Retailer. I offer that exhibit in evidence.

The Court: It will be received and marked filed.

Mr. Flam: I likewise offer Exhibit X, the Gilfillan tuner in evidence.

The Court: It will be received and marked filed.

The Clerk: Defendant's Exhibits V and X received in evidence.

(The documents referred to were marked Defendant's Exhibits V and X, and were received in evidence.)

Mr. Flam: I also offer in evidence Exhibits JJ-1 and LL-1. These are the plungers identified with exhibits JJ and LL.

The Court: It will be received. [633]

(The articles referred to were marked Defendant's Exhibits JJ-1 and LL-1, and were received in evidence.)

Mr. Flam: Exhibit RR was not received in evidence over the objection of opposing counsel. That is a page from a leaflet in connection with electrical measurements. I am now renewing my offer.

Mr. Lyon: I think our objection really goes to the weight of it. On thinking the matter over, your Honor, our objection really went to the weight of it and with that understanding perhaps the objection should be overruled. I think our objection really goes to the weight of it.

The Court: The exhibit will be received and marked in evidence.

(The document referred to was marked Defendant's Exhibit RR and was received in evidence.)

The Court: Are we together on the fact that Exhibit LL-1 for identification is not in evidence?

Mr. Flam: I think I offered it just a moment ago. If I didn't I meant to offer Exhibits JJ-1 and LL-1.

The Court: In any event they will be received.

Mr. Flam: In this book of patents, which has been supplied to the court, there are a number of patents that show the volume of inventions and patenting relating to automatic tuning in and about the period when the Leishman application was filed and the Leishman patent issued. [634] That is in furtherance of showing a different state of facts here as compared with the Associated Wholesale Electric case in which Judge Harrison said there appeared to be a dearth of inventions in this field.

On that basis I would like to offer the following—I am offering the following patents in evidence. First, the patent that appears as No. 2 in the book, Bast, No. 1687420.

Mr. Lyon: I will object to this as not rebuttal, your Honor. The plaintiff has completed his case without these matters in the record to refer to or to cover and it would require the case to be thrown open, wide open, and present testimony on them if these patents are received.

The Court: I think so, Mr. Flam.

Mr. Flam: I think I mentioned on the record a few days ago that I was going to offer certain exhibits in evidence and otherwise we were through.

The Court: Can you refer the court to that portion of the transcript?

Mr. Flam: At page 312, your Honor, at the close of Defendant's case. I said, "I would like to reserve the privilege of introducing in evidence certain other matters as to which, probably, a stipulation has been entered into, before the end of the trial. I think I can probably formulate them tonight and introduce them tomorrow."

We went on from there and I overlooked the introduction [635] of them until just now at the conclusion of the plaintiff's case.

The Court: I don't want to restrict either of you in offering whatever you think is relevant here, but on the state of the prior art it seems to me that when you took up the case on the theory that you had the right to open and close you should have explored the contentions as to the state of prior art fully at the time of the presentation of your case.

Mr. Flam: It is not, your Honor, so much a matter of prior art. It is not at all a matter of prior art. Judge Harrison in his decision said:

"There are only two other patents relating to automatic tuning before Leishman."

Now, they are not pertinent except for the fact that these patents are in existence and your Honor might almost take judicial notice of the fact that

these patents are in existence without offering anything at all about what they show, so long as they are entitled in the title as relating to automatic tuning; and no evidence will be offered other than that and for that purpose without——

The Court: How many are there?

Mr. Flam: There are about 15 or 20 in all in this volume. I think Mr. Lyon has a copy of the volume in his possession. [636]

Mr. Lyon: May I ask if these patents were all in evidence before Judge Harrison?

Mr. Flam: None of them.

The Court: That is the point.

Mr. Lyon: The Bast patent isn't.

Mr. Flam: The Bast patent was not in evidence. I think the Bast patent was referred to in the brief for the first time in the Circuit Court of Appeals.

The Court: But not in evidence was it referred to.

Mr. Flam: Was referred to by number in the brief and I think the opposing side made quite a point about the fact that there was no evidence of other patents in that case.

Mr. Lyon: If I can understand just what is contemplated in these patents we can reach an agreement and obviate this.

If these are the same patents as in the Radio Condenser case that were presented in the Circuit Court of Appeals and which were urged by Mr. Leishman constituted new evidence upon which

they should reconsider their decision in the Associated case, and which Judge Matthews said was not new evidence and wouldn't change his opinion, if it is those patents and Bast is one of them, why, I will withdraw my objection just so the record may be complete before this court. But if they are new prior art patents that haven't been considered at all, why, I insist on my objection.

Mr. Flam: They are not prior art patents and they are [637] not referred to for that purpose. I think I made it clear to your Honor what the purpose was. The purpose was to show that there was activity in this field. Of course we already have some evidence about it but not as complete a file as Mr. Leishman has collected here on that particular point. There were inventions in the field of automatic tuning, a good many of them at that time.

The Court: I am not going to foreclose the other side from exploring any patents that are offered and received in the case. But I don't want the case to get in the same position as apparently the other two cases got into. That is the reason why I am making these statements. The case should be decided between the litigants so that the industry can go forward with whatever activities it has so that patent rights may be conserved instead of having the situation that we had in some of the earlier patent cases in this circuit where there was nothing done for years. In one case it went for 20 or 25 years. That was one of the flota-

tion cases from Montana. The record should be made just as complete as the litigants desire to make it, but I do think you should have in your case in chief adopted that course when you assumed the opening and closing of the case. I think you should have explored it. You didn't do it but I am not going to foreclose you and for that reason I am going to give the other side an opportunity to explore it. [638]

Mr. Flam: Perhaps we can come to a satisfactory conclusion by a mere stipulation to the effect that up to the year 1937 there were at least 20 or 25 other—I will make it more definite. At least 30 patents that dealt with automatic tuning for radio receivers. That is about the sum and substance of this whole offer.

Mr. Lyon: I couldn't make a stipulation of that kind because it would be important as to what those tuners were. As I understand Judge Harrison's opinion, he was pointing out that this feature of coaxiality wasn't anything new; that as soon as there was a tuner available with an adjustable tappet and rocker it was adopted in that kind of tuner and coaxiality was the only feature that was claimed to be new and in his opinion the patent was lacking in patentable novelty. He may have used language that you can construe a little broader than that but I think that is what he meant.

Mr. Flam: In the record of the Associated Wholesale case, your Honor, the opinion goes as follows. I don't know where it is in Volume 36.

The Court: I have it.

Mr. Flam: "The demand for an automatic tuning device did not become acute in the radio industry until the later part of 1936 or the early part of 1937. This is demonstrated in many ways. The [639] record discloses a dearth of inventions in this field."

Then on the preceding page the court said:

"The facts in this case do not indicate an appreciable demand for a tuner until about the fall of 1936. The Schaefer patent No. 1,906,106 was issued in 1933, and the Flaherty patent No. 1,948,373 in 1934. The evidence reveals no other issued patents until 1937 and 1938 when the plaintiff obtained two patents."

Now, all we want to do is to have something in the record here that there have been numerous other patents relating to automatic tuning in that period.

I thought I would cut short the necessity of having a reopening of the proof to settle it. It is just for that purpose. If any statement can be made by Mr. Lyon to the effect that these are not patents relating to automatic tuning that can be done—no evidence need be introduced to interpret these parts or anything else. I don't want it. I don't think it is necessary. It is merely directed to this particular point in Judge Harrison's opinion. He was not aware of all of these prior developments in automatic tuning.

The Court: Are you familiar with the record

in the case that you say is on appeal to the Tenth Circuit Court of Appeals, Mr. Flam?

Mr. Flam: I am somewhat familiar. I think I know pretty [640] well what is in there. If your Honor means whether these parts are in there I think I can find out very quickly. Mr. Leishman says there are only about ten of these patents that are in that record.

The Court: You only had six here, I believe.

Mr. Flam: There are about 25 or 30 in this volume relating to automatic tuners as of that period.

The Court: And you want to put all of those in the record, is that it?

Mr. Flam: There was intensive activity.

The Court: You are proposing to offer all of those patents?

Mr. Flam: Yes, your Honor, for that purpose only.

The Court: I will permit you to do so but I will give the other side an opportunity to answer them if they desire. That will prolong the case, of course, if they do desire to do so. What are the patents?

Mr. Flam: I will offer them individually.

The Court: The objection will be overruled as to the Bast patent for the reasons assigned and not otherwise.

The Clerk: Defendant's Exhibit HHH in evidence.

(The document referred to was marked Defendant's Exhibit HHH, and was received in evidence.)

Mr. Flam: And I offer in evidence Faas, 192820, No. 5 in the book of patents. [641]

Mr. Lyon: I don't want to repeat my objection if it may be understood as just applying to each one of these individual offers.

The Court: It will be so ordered and the objection is overruled for the reasons heretofore stated.

The Clerk: Defendant's Exhibit III in evidence.

(The document referred to was marked Defendant's Exhibit III, and was received in evidence.)

Mr. Flam: I offer in evidence Patent No. 1865704. It is No. 7 in the book of patents.

The Court: It will be received and marked filed.

(The document referred to was marked Defendant's Exhibit JJJ, and was received in evidence.)

Mr. Flam: I offer in evidence Trenor No. 1712181 in evidence appearing as Patent No. 8 in the book.

The Court: I do not see how that patent can assist the court. The objection is sustained as to that one.

Mr. Flam: It is one of the patents that shows on the second page of the drawings——

The Court: You are talking about Trenor No. 1712181?

Mr. Flam: Yes.

The Court: Filed November 21, 1922.

Mr. Flam: Yes, your Honor, filed November 21, 1922.

The Court: It wouldn't help the court very much.

Mr. Flam: Then we will omit that, your Honor. I will [642] go to the next one. I offer in evidence Vasselli, re-issue No. 17002, found as No. 9 in the book.

The Court: Objection overruled.

(The document referred to was marked Defendant's Exhibit KKK and was received in evidence.)

Mr. Flam: I offer Patent, Flocco No. 1591417, appearing as No. 11 in the book.

Mr. Lyon: It doesn't seem to me, your Honor, that that patent bears on your offer, Mr. Flam. This is a remote control device rather than a tuner in the sense that we are talking about.

It is not an automatic station selector even. It is a remote control device.

Mr. Flam: Of course whether the tuner is operated from a remote point or directly by hand would not make any difference. It would still be an automatic tuner.

Mr. Lyon: This doesn't have any automatic feature. This merely turns a condenser. Maybe if we can keep some of these out we can save time in putting evidence on about them.

Mr. Flam: In order to save time I am willing

to omit that, your Honor, and go to the next one.

I offer in evidence the patent, Trogner, No. 1727575, appearing as No. 12 in the book.

Mr. Lyon: This patent I don't think belongs in the [643] record, Mr. Flam, because it is for a transmitter. It isn't for a radio receiver—for tuning a radio receiver at all. If you will look at these, if you don't mind my calling attention to it——

Mr. Flam: That is all right.

Mr. Lyon: We can avoid a lot of testimony.

Mr. Flam: I am glad to have you call my attention to it because actually I had not made any great study of these because I didn't think it was necessary. That may be omitted, your Honor.

I offer in evidence Vasselli, No. 1846289, appearing as No. 13 in the book.

The Court: I don't believe that has any data that would be of value to the court.

Mr. Flam: It is a station selector, your Honor.

The Court: That is a rather far-fetched position. It is a matter of common knowledge, isn't it, that there was a great deal of work of similar type done during that period or thereabouts? If you are going to put every device that is of similar nature in this record I am afraid we will never get through. [644]

Mr. Flam: Apparently there wasn't enough of that knowledge present before Judge Harrison.

The Court: Judge Harrison took that case, as I told you before, the case that enunciated the principle that I have never seen improved by any of

the later decisions, the Eibel Paper case, and from that he reasoned his reasons to the conclusion that he reached that he expressed in his opinion.

If in addition there is something that he didn't consider that would be helpful, that would be one thing, but just to throw forty patents to the court and say, "Here it is," that doesn't help. Any of these patents that are received will have to be discussed in the briefs. I am not going to undertake to analyze these patents independently of the briefs of the litigants.

Mr. Flam: I don't expect that. We will have to show——

The Court: I apprehend that your client here wants you to put in these forty patents.

Mr. Flam: I can put Mr. Leishman on the stand and simply ask him one question, how many patents there were that he was able to find relating to automatic tuning.

The Court: If he won't say forty, I will hear him. But if he will say forty, I won't hear him.

Mr. Flam: He will say over and above those that we have identified, I don't venture to say more than ten or fifteen [645] that he has known about.

Mr. Lyon, Sr.: That won't answer our point, because our point is that these patents are not pertinent because they don't show that anybody was trying to make a tuner of the adjustable tappet type with a rocker, and didn't know enough to make it coaxial. The only point that Mr. Leishman is relying on is coaxiality, so if there were fifty other

tuners that didn't have any room for coaxiality, couldn't have been made coaxial anyhow, because they are not of that type of tuner, why, I think that these have nothing to do with the case.

Of course, that is argument and we will point it out in our brief, but I do want whatever is to be relied on, I want it to be in the record so that we can point out why we distinguish it.

The Court: Yes, you have a right to that, notwithstanding the fact that he should have done it at the time he presented his case in chief.

The objection will be sustained to the last offer.

Mr. Flam: I offer in evidence the patent of Bird, 1,925,651, appearing as No. 18 in the book.

The Court: That will be received.

The Clerk: Defendant's Exhibit LLL, in evidence.

(The document referred to was marked Defendant's Exhibit LLL, and was received in evidence.) [646]

Mr. Flam: I offer in evidence the patent of Morin, 1,828,197, appearing as patent 19 in the book.

The Court: So received.

The Clerk: Defendant's Exhibit MMM, in evidence.

(The document referred to was marked Defendant's Exhibit MMM, and was received in evidence.)

Mr. Flam: I offer in evidence the Hirsch pat-

ent, 1,942,599, appearing as No. 20 in the book of patents.

Mr. Lyon: This is a very complicated patent, and I don't think it has a place in what you are looking for. It starts out and talks about an automatic time responsive setting mechanism for selective timing of electrical circuits. It has particular reference to mechanism for responding to the pre-determined frequency at a pre-determined time.

Mr. Flam: That, of course, is true of the Marschalk patent upon which the other side most strongly relies. It is exactly that same kind of mechanism.

Mr. Lyon: This hasn't anything to do with a tuner for a television station, or combination radio and television station, or a radio.

The Court: Well, it has some drawings that might look like some of the parts that are involved in the patent in suit.

Mr. Lyon: If somebody can invent a radio tuner that when the advertising comes on it will turn the machine off and then [647] start it again, it would be this type of device, your Honor.

The Court: I don't think it has much value in the case, Mr. Flam. The objection will be sustained.

Mr. Flam: I offer in evidence the patent to Lefebre, 1,932,668, appearing as No. 21 in the book of patents.

Mr. Lyon: This, Mr. Flam, is a motor tuner, a motor-driven tuner. Mr. Schwarz testified about there being lots of those in use. Are you interested in motor tuners?

Mr. Flam: It was one form of device that was attempted in those days.

The Court: Objection sustained.

Mr. Flam: I offer in evidence the patent to Nelson, 2,042,956, which appears as No. 23 in the book of patents.

Mr. Lyon: This is another timing device, Mr. Flam.

Mr. Flam: This is in conjunction with tuning. In fact, the title so says.

The Court: Were any of these patents—I don't mean any of them, because I know some of them are, but I am speaking now of those that are offered for the first time in this case, or referred to in this case before this court for the first time—patents which were cited in any of these interference proceedings?

Mr. Flam: I imagine some of them were. I would say that I am quite certain that some of them were. I am not sure whether all of them were. [648]

The Court: Of course I have not read the whole patent, I have looked at the drawings, and there are some drawings that look like drawings that are annexed to the patent in suit. That doesn't help me very much in interpreting the patent.

Mr. Flam: I think, if I may interrupt, we can rely upon the testimony taken in the course of the trial, in addition to those that I have already offered, and close the matter now. That will save further controversy about that matter. I don't want to say what your Honor thinks about it, but I think

we have introduced enough evidence now to show this was not just something that sprang out of nothing. There was an intense amount of work done in connection with radio tuning before and after Leishman came upon the field.

The Court: The court is not going to give any expression to that phase of it until the case is studied thoroughly.

The Clerk: Is that last offer withdrawn, Mr. Flam?

Mr. Flam: Yes.

I would like to call Mr. Ellsworth to the stand.

ALLAN R. ELLSWORTH

called as a witness by and on behalf of the defendant, in rebuttal, having been first duly sworn, was examined and testified as follows:

The Clerk: Your full name, please?

The Witness: Allan R. Ellsworth.

Direct Examination

By Mr. Flam:

Q. How old are you, Mr. Ellsworth?

A. Forty-three.

Q. Where do you reside?

A. 8469 Hollywood Boulevard, Los Angeles.

Q. What is your present occupation?

A. I am a manufacturer of phonograph records.

Q. Have you had anything to do with radio receivers in the past?

A. I was chief engineer of Packard-Bell Company from 1933 to 1945.

(Testimony of Allan R. Ellsworth.)

Q. In the course of your duties did you have anything to do with automatic tuning devices for radio receivers?

A. Quite a lot to do with it.

Q. What, will you state? A. Pardon?

Q. Will you state what you had to do with it?

A. Design of receivers using automatic tuners.

Q. Where did you get the automatic tuners during this period?

A. We purchased some tuners from Quality Hardware in Chicago.

Q. Any others?

A. I think that is about the only type we used other than the electrical type.

Q. Did you get any tuners from Crowe Nameplate?

A. That is correct, we did. I think what happened was we originally bought them from Quality Hardware and later they were available from Crowe Name-Plate, but it was essentially the same type of tuner. It has been quite a few years, and I might be a little hazy on some of these things because of the time element, and I haven't been in contact with it, naturally I don't recall some of these things accurately.

Q. What were the tuning devices that were used with these automatic tuners? I mean, what were the devices that were used in the electric circuit that was operated by these radio tuners?

A. We operated a variable condenser.

(Testimony of Allan R. Ellsworth.)

Q. Can you state what the custom was with regard—what your own experience has been with regard to the necessity of having the radio condenser provide a light load or large load in connection with the tuning mechanism?

A. There had to be an absolute minimum of load in connection [651] with the tuner. If there was any load at all it wouldn't position accurately, it was too hard to push the button. It would be rather difficult for a child or a woman to operate it.

Q. You say that the condensers used in automatic tuners at the time they came, that you were designing radio sets for them, had to have low resistance to turn them, is that right?

A. That is correct.

Mr. Lyon: Just a minute. Is this witness talking about the subject in abstract, or is he talking about the particular tuners he got from the Quality Hardware or Crowe Name-Plate Company? If he is talking about something else, I want to know what it is and what he knows about it.

Q. (By Mr. Flam): These tuners that you obtained from Crowe Name-Plate or Quality Hardware included what elements? Did it include the condensers or other devices for tuning radio circuits?

A. No, they were just the unit itself; the condensers were purchased separately from another source. And, answering your question more fully, that you previously asked, we had to have the con-

(Testimony of Allan R. Ellsworth.)

densers made specially with a very light torque in order to make it possible to use these tuners. Condensers as were supplied at the time we were working with push-button tuners were too heavy, that is, too much friction. [652]

Q. At what time was this, what year, as near as you can state?

A. I suppose it was about 1937 that we started working with that.

Q. At that time these condensers, you say, that you obtained or bought for the Packard-Bell people offered too large a resistance for the purpose of push-button tuning, is that correct?

A. That is correct. Condensers available at that time were too heavy in torque.

Q. Was anything done by the Packard-Bell to improve these condensers that were bought in this manner?

A. Well, we couldn't do very much with the ones we purchased from one of the suppliers we were using at the time, that was a fixed adjustment at the factory. There were others on the market which could be adjusted by a set screw in the rear of the condenser. In that case we were able to use those condensers by readjusting them in our own factory.

Q. Did you have any condensers made to your order for the purpose of using them with the automatic tuners you had?

A. All the condensers were made to order for automatic tuners, after we had discovered that it was necessary to lighten the torque.

(Testimony of Allan R. Ellsworth.)

Q. Who made those condensers?

A. Most of them were made by American Steel Package. [653] We also purchased them from Radio Condenser Company.

Q. Did you make any specification as to the resistance to turning of these condensers that you ordered from these people?

A. By agreement there was a mark put on the back of the condenser, it was a zero. The manufacturer used the expression of zero torque for those condensers. Whether it was actually zero torque, or not, of course, is a matter that would be open to discussion. But it was as light a torque as could possibly be made and still have the plates stay in position without rotating.

Q. How much would you say—would it be less than one inch ounce, or greater?

A. That would be a point that would be open to discussion, because I don't recall the figures at the time. But I do know that it had to be as light as possible and still allow the plates to maintain their position.

The Court: You don't know what the torque measurement was, then, do you?

The Witness: I don't recall at this time. It has been too long since I have done the work, and I wouldn't want to make a guess at it. I don't have records at home of my work at that time, either.

Q. (By Mr. Flam): In the automatic tuning mechanisms that were provided in Packard-Bell

(Testimony of Allan R. Ellsworth.)

sets, was anything else [654] done to reduce the load on the push-button?

A. We had to reduce friction at all points, such as the operation of the pointer. The pointer itself came in for some redesign, we had to put a couple of little buttons on the slider, so that there would only be two points of contact instead of having contact all along the length of the slider as had previously been the case. We had to use large pulleys over which the cord ran instead of small pulleys, because of reducing the friction enough to make a difference, sufficient difference so that it would be felt on the button. We had to disconnect the manual tuning from the push-button tuning by some means in order to remove that load.

Q. Regarding the setting of the automatic tuner mechanism so that they would bring in a predetermined station, what were the trade requirements as to the facility with which these settings could be made at the time you were at Packard-Bell?

A. I don't quite understand your question.

Q. I understand that these automatic tuners have something adjustable in them to bring in a desired station, a tappet or a cam or something of that sort. Now, if that process of adjustment was difficult, would it have been commercially feasible to utilize such automatic tuners?

A. Well, if it were difficult it is hardly likely that [655] it would be acceptable, because most dealers, distributors, and so forth, wouldn't have

(Testimony of Allan R. Ellsworth.)

anything to do with a device that required a lot of service. Radio had reached the stage of merchandising at that time that most merchandisers just wanted a package to sell, they didn't want to have anything to do with it. They didn't want to adjust it or anything else. In fact, we had difficulty at first with push-button tuning because they even wanted to have the radio adjusted to the stations in their own localities, in spite of the fact that we made it very simple for them to adjust it.

Q. Was it necessary to specify the amount of pressure that could be used on the push-buttons to bring in a station, or for the setting operation?

A. Not in the tuner we used that was a Quality Hardware unit. It wasn't necessary to state anything about the pressure of adjustment.

Q. Would it be a practical matter to inform the trade or the public as to the amount of pressure that would be exerted on the push-buttons in connection with the operation of tuning or of setting the tuner to a required station?

A. Well, you would not have any way of saying how much is too much. It doesn't seem that it would be practical, because what would be too much for one person would not be too much for another. And it doesn't seem that it would be possible to make any accurate adjustment in that case. [656]

Q. What would be the instructions to the user of these push-button tuners regarding the pressure that would have to be used in the process of setting the tuner to a station?

(Testimony of Allan R. Ellsworth.)

A. Which tuners are you talking about now?

Q. Well, generally any for the present.

A. Well, at present I wouldn't know, but at the same time we were working with tuners, the Quality Hardware unit, there was no statement necessary at all as to the pressure.

Q. That is, you could use any pressure?

A. Yes. It didn't matter at all. You just pushed the button and then adjusted it, that is all there was to it. There was no statement whatever about pressure.

Mr. Flam: That is all. Cross-examine. [657]

Cross-Examination

By Mr. Lyon:

Q. Now, Mr. Ellsworth, during the period that you were using the—let me ask first, am I correct in understanding that the only automatic tuner as such that you used was the Quality and Crowe tuner?

A. Well, in the beginning that was the only kind we used—that and the electrical push button, but I think here we are only discussing the mechanical type of tuner.

Q. That is correct. I want to distinguish from the motor-driven.

A. We did use the motor-driven type.

Q. For the purpose of my question I want to narrow it down to the actual mechanical tuner involving a push button or a lever and not a motor-driven and not any electrical switch type.

(Testimony of Allan R. Ellsworth.)

A. The Quality Hardware type was the type we used in the beginning and used most of the time. I am not—in fact I know we did use other types later on, perhaps a year or two later we used other types but we found the Quality Hardware unit to be the best of all of them for our purposes.

Q. And you can't remember what other, if any, automatic tuner you used?

A. Well, we did use one made by the American Steel Package with a tape as an adjustable means.

Q. With a tape as an adjustable means?

A. Yes, a tape type of tuner. It wasn't altogether [658] satisfactory and we didn't use it very much.

Q. Aside from that tuner were there any others?

A. Well, I don't recall that there was. As I say, there has been quite a little time gone by and it has been perhaps ten years now and it is quite a long time to remember back.

Q. Then we can reasonably safely say though that according to your present memory, that aside from that tuner which you say wasn't particularly satisfactory, the only one used was the Quality type?

A. That is right.

Q. Now, when did you use that Quality type tuner?

A. As I recall, it was in 1937 when we started using it.

Q. Pardon me.

A. As I recall, it was in 1937 when we started using that tuner.

(Testimony of Allan R. Ellsworth.)

Q. And how long did you use it?

A. Well, we used them consistently up until the war, as a matter of fact.

Q. You used the Quality tuner?

A. Yes, we used it—well, it was made by Crowe Name Plate later on.

Q. Yes, we understand that, but you used it consistently until the war? [659]

A. Yes, I believe so.

Q. Now, what type receivers—let me ask it another way. During this period did you manufacture various types of receivers? A. Yes.

Q. How many various types?

A. Oh, we had as many as 30 models.

Q. Did you use the Quality tuner in all of the models? A. No.

Q. How many of them?

A. We used them only on a few models. We never used the same thing in all models.

Q. How many of the models did you use the Quality tuner in?

A. Well, I wouldn't want to answer that without referring to technical information which I don't have available. That is as to that period because it has been too much time and I just probably would make the wrong statement.

Q. Can you make an estimate as to about how many out of those 30 types that you used the Quality tuner on?

A. I can say that we used it on the smaller

(Testimony of Allan R. Ellsworth.)

models, whereas on the larger models we used the electrical push button.

Q. Was there any particular reason for the distinction? [660]

A. Well, the electrical push button type was more expensive and we could afford to use a more expensive unit in the higher-priced models.

Q. Do I deduce correctly from that that the electrical type was more satisfactory?

A. That is a matter of opinion.

Q. Well——

A. One engineer would argue with you it was better and another would argue with you it was not as good.

Q. What is your opinion?

A. Well, I don't think I had any particular opinion at the time because I was interested in making what would sell.

Q. You stated that you used the electrical type in the more expensive sets because you could use a more expensive tuner in the set. Now, I got the inference from that statement that the electrical tuner was better. Now, do you want to change that statement or was the electrical tuner better?

A. I am not interested in trying to create inferences or anything like that, but at the time we are discussing competition more or less dictated what you used. If the larger models of our competitors had electric push buttons naturally we would have electric push buttons, too. You can't make an in-

(Testimony of Allan R. Ellsworth.)

ference on that basis that the electrical [661] push button was better.

Q. You did, however, use the more expensive tuner when you could?

A. Yes, of course—now, wait a minute. I don't mean it that way—"When we could," because we used the electric push button unit on the basis of what competition demanded.

Q. What did competition demand?

A. At the time the higher priced models most competitors had electrical push buttons.

Q. Now, taking the lower priced models. Were there any considerable distinctions in the structure in the various types of those lower priced models with which you used the Quality?

A. How do you mean "distinctions"?

Q. Well, for example, in these lower priced models were there differences in pointer setup or for example, manual control—for example, were they two-gang or three-gang? Were they in those various respects—were there any outstanding differences? I am trying to save time, Mr. Ellsworth. I can take them one by one if you can recollect them, but if there are any—

A. I think that is self-evident. There was differences in receivers just as you have differences in units here, but all embodying similar devices. [662]

Q. Those differences were in mechanical structure?

A. They were to suit each designer's problem

(Testimony of Allan R. Ellsworth.)

that had to do with the cabinet, the size of the cabinet that the unit had to be put in; the sales department idea of what would be merchandisable and that sort of thing.

Q. All right. Did you use the same pointer mechanism in the various low priced units?

A. We used a similar type of pointer mechanism in most of them. I wouldn't say the same simply because you had to have different size dials for different cabinets.

Q. All right. Did the pointer unit used in each receiver have the same structural principles, mechanical principles?

A. They may have but didn't have to if you are getting at the idea that some may have been pointers and some may have been the slide type of dial because that is a matter open to choice of the individual designer.

Q. Well, I am asking you were some of them sliders and some pointers?

A. Yes, some were pointers and some were sliders.

Q. Now, were there any differences in the friction in those pointer mechanisms?

A. Well, originally we had the most success with the pointer type because we hadn't found how to overcome the friction in the slider type. Afterwards we discovered ways [663] and means of overcoming that friction and then we used more of the slider type dial.

(Testimony of Allan R. Ellsworth.)

Q. In other words, the slider type had more friction in it than the pointer type?

A. Obviously it would have because the pointer is fastened on the end of the condenser shaft and doesn't involve any friction at all—that is to move the pointer, since it is just fastened right in the end of the shaft. It was in our case in our design.

Q. Will you perhaps more completely describe the pointer mechanism that you used?

A. The variable condenser was positioned in the chassis so that the shaft would point toward the front of the cabinet. The dial was fastened onto the front of the cabinet or onto the chassis, whichever was the most convenient. The shaft would come through the dial and the pointer was the—was fastened right onto the shaft.

The push button mechanism operated the variable condenser through a pulley but so far as the friction involved in turning the pointer was concerned, there was no friction in turning the pointer.

Q. And how about the slide mechanism that you used?

A. The slide mechanism was operated by a pulley that was fastened onto the variable condenser shaft, having a cable or cord running through the pointer and back around [664] through the pulley.

Q. Now, Mr. Ellsworth, how about leaving the pointer and the slide mechanism and tell me what type of ganging you used in these various receivers?

A. Two or three-gang usually.

(Testimony of Allan R. Ellsworth.)

Q. Did you use both two and three-gang?

A. Yes.

Q. And you used the quality tuner with either the two or three-gang condenser, is that right?

A. That is correct, although we preferred the two-gang because it was a little easier to operate.

Q. When you say "easier to operate" do you mean it took less of——

A. Less torque.

Q. Of a torque?

A. Less torque, yes.

Q. Now, you testified that you ordered zero torque condensers. Now, did that mean that these two-gang condensers had a total torque of zero torque?

A. Well, I don't think you could say it had a zero torque. There would be some torque of course, but it was the agreed designation between us that the condenser would be marked zero on the back, which indicated that that was the absolute minimum torque that could be supplied.

Q. Absolute minimum torque that could be supplied? [665]

A. By that manufacturer.

Q. By that manufacturer. And when he marked a two-gang condenser or a three-gang condenser zero, what he meant was that the three-gang condenser was down as low as it could get?

A. That is correct.

Q. Now, in your opinion did they get these condensers down pretty low?

A. Well, they got them down to the point where they were just inside of not staying in position by themselves.

(Testimony of Allan R. Ellsworth.)

Q. In other words, considerably lower than the commercial, the ordinary commercially available condenser or condenser gangs?

A. At that time, yes.

Q. And it was on some special order that you got this type of condenser?

A. That is correct, although it became almost automatic that we got those kind in the future because they changed the torque of all condensers and the heavy condensers that we had received previous to push button tuners weren't supplied any more.

There was one designation of one above the designation of zero and it was just a little more torque, but even that condenser could have been used in the push button tuning. How much torque that was I don't know. [666]

Q. Do you mean to say that you used that condenser?

A. We didn't use that designation but that was about the only two types that were available from there on. In other words, what I am trying to say is that when push button tuning came into prominence, why, the manufacturers just automatically reduced the torque on all condensers from then on.

Q. Is it your testimony then that, for example now in the use of push button tuners the condensers used are zero or one torque?

A. Well, they are probably about that amount of torque—in that range, because it was pretty much a changeover in the condenser industry at that time.

(Testimony of Allan R. Ellsworth.)

Q. And in your opinion then you can't use, for example, three-inch ounce or three and a half-inch ounce tuners with these push button—I mean condensers with these push button tuners?

A. I would have to know what the manufacturers' designation of zero was equal to before I could say that. Maybe his designation of zero was equal to three ounce.

Q. Let us say zero is equal to about one-inch ounce—I mean an actual measurement on it.

A. If you want to be hypothetical you could arrive at most anything.

Q. Let us be hypothetical. [667]

A. I don't think that would prove anything. However, if you are trying to prove something—

Q. Well, you have testified to zero inch ounce and one-inch ounce.

A. No; I have merely testified to a designation.

Q. Designation of zero and a designation of one?

A. Yes.

Q. What did the one mean?

A. One meant more torque than the absolute minimum the manufacturer could supply and was suitable where push buttons were not used.

Q. Suitable where push buttons were not used?

A. Yes, just the two types available after the push button came into effect—that is commonly available on a production basis.

Q. I understand then the only condensers that were usable with the push button tuner after the

(Testimony of Allan R. Ellsworth.)

push button tuners began to be used, were the zero type?

A. Well, I think they were both usable if you were willing to have a little more pressure on the button.

Q. Then I won't say "usable," I will say "used."

A. By the Packard-Bell Company there was only the zero type used. I am not talking for any other manufacturer—I can't.

Q. Yes, I understand that. And the zero meant just [668] as little load as there could be and still hold the condenser plates—keep the condenser plates from falling down?

A. That is correct. I will also point out another factor which was something of a problem and was the reason why the one designation type of condenser was used, and was used by other manufacturers. As a matter of fact in push button tuning they had trouble with microphonism because of the very light adjustment and they couldn't get away with that very light torque type so they had to have a little heavier torque condenser and this one designation type was the one they used usually in that case. My memory is returning to me a little.

Q. I may have misunderstood either one or the other of your answers, but I understood the one type wasn't used by you people with the push button tuner.

A. That is correct, because we had no trouble with microphonism sufficient to make it necessary.

(Testimony of Allan R. Ellsworth.)

Q. Why didn't you have trouble?

A. Well, in the way we designed our equipment. We found means of avoiding that.

Q. Your equipment was all household equipment, was it not? A. That is correct.

Q. You didn't manufacture any automobile sets?

A. Not with push buttons. [669]

Q. Why didn't you manufacture—why didn't you put, let us say, push buttons in automobile sets?

A. As a matter of fact, we weren't manufacturing automobile radios at that time at all. I think we discontinued manufacturing automobile radios about 1936, it seems to me.

Q. Let us go back to the household sets then. What kind of manual tuning means did you use in these household sets?

A. There were several types. The most common type was the pulley on the shaft with a cord running to a separate shaft positioned in a different location.

Q. Generally speaking would that be a high or low friction type?

A. Well, it would naturally be a high friction type. If you had no trouble with microphonism either one would be practical to use—either type.

Q. Well, you stated you didn't have any trouble with microphonism. A. That is correct.

Q. Then did you use either type?

A. We could use either type.

(Testimony of Allan R. Ellsworth.)

Q. Did you use either type with your push button control?

A. No, I don't believe we would have used the other [670] unless it was absolutely necessary because of the shortage of one type. I don't recall of any occasion where we did use it or could use it.

Q. Used which? A. The heavier type.

Q. In other words you used the lighter type?

A. At all times.

Q. Then in your set—let me ask you first, are there any other points of load or friction, let us say, in one of those sets which you manufactured?

A. Well, there was the tightness of the cord running over the pulleys that had to be—couldn't be too tight or it would increase the friction. We had to be very careful in our choice of the compensating spring which adjusted the tension of the cord.

Q. Were you careful in all those instances to keep load out of the device?

A. That is correct.

Q. Then is it fair to state that in the use of this Quality tuner in every detail of your radio receiver you removed as much load as was humanly possible? A. That is correct.

Q. And that you especially designed or gave special attention to proper engineering features in avoiding microphonism so you could do [671] that?

A. That is right. Let me point out one other thing about that. You know in designing a device

(Testimony of Allan R. Ellsworth.)

for public consumption you must consider competition and the lightness of touch of a push button unit naturally would enhance the salability of the unit. That was one of the reasons for keeping that load down. In other words how much you could reduce that was a matter of the individual manufacturer's choice. It happened that the Packard-Bell—well, we followed that practice. With some of the other push button tuners on the market you could push the button and practically push the radio off the table before it would operate. That was because the designer had not considered the lightness of load all the way throughout the device. Now, there is such a thing as a radio, let us say for example an automobile radio, where it doesn't matter how hard you have to push because the unit is fastened and you can push it as hard as you like. You can't push it away from you. But a small radio sitting on a table is so light if you push it hard you would push it clear off the table.

Q. Conversely, those radios of yours that you have described wouldn't be adaptable for use in an automobile, would they?

A. I would have to study that before I could answer that question, because they weren't designed for automobile radios. Whether you are talking about radios or the devices—if you are talking about the push-button unit—

Q. I am talking about the whole finished receiver.

(Testimony of Allan R. Ellsworth.)

A. Well, it was designed for use in homes, not in automobiles. Obviously, it wouldn't be practical.

Mr. Lyon, Sr.: Have we an exhibit here, Mr. Flam, that illustrates this Quality tuner that the witness says he was using?

Mr. Flam: Yes. I was trying to find it.

Mr. Lyon, Sr.: I would like to have it identified so the court will know just what tuner he had.

The Court: What is BB there?

The Clerk: BB is the Crosley tuner, your Honor.

Mr. Flam: I think, your Honor, FF is what the plaintiff intends to use.

Q. (By Mr. Leonard Lyon, Jr.): Mr. Ellsworth, I show you Defendant's Exhibit FF, which is a tuner; how does that compare with the tuners about which you have been testifying?

A. We didn't use this identical unit, but I think that the same dies were probably used in making the buttons and [673] the same general design. That is, ours was a four-button unit, very similar to these three buttons. If you were to cut this off (indicating) right here and complete this as a four-button unit, that was essentially what we used. Although it had a shaft coming out at the end here, out of one end of it.

Q. Did the devices use a rocker or treadle bar similar to the rocker in the device Exhibit FF?

A. Yes.

Q. Did they use plungers similar to these plungers? A. Yes.

(Testimony of Allan R. Ellsworth.)

Q. Did they have similar tappets pivotly mounted on the plungers which pressed against the rocker and positioned the rocker?

A. Yes, I would say the construction of the plungers and treadle bar and the locking device were the same.

Q. In other words, in essential respects this device is pretty much the same as the devices that you used?

A. That is correct.

Mr. Lyon, Jr.: That is all.

Mr. Flam: No redirect examination.

I would like to recall Mr. Leishman to the stand:

LeROY J. LEISHMAN

called as a witness by the defendants, having been previously sworn, was examined and testified, in rebuttal, as follows:

Direct Examination

By Mr. Flam:

Q. Mr. Leishman, you have testified before in this case, haven't you?

A. Yes, I think that is obvious.

Q. I think you were asked on cross-examination whether you knew what the situation was with respect to automatic tuning on current household sets, and you said you didn't know what that was. Is that right?

A. That is correct.

Q. Then on redirect you said you had no opportunity to examine current models, is that right?

A. That is correct.

(Testimony of LeRoy J. Leishman.)

Q. Did you hear Mr. Schwarz's subsequent testimony to the effect that automatic tuning was coming into disuse in household sets and that one reason was that it was not sufficiently accurate for frequency modulation sets?

A. Yes, I heard that.

Q. Have you done anything since last Thursday to ascertain whether automatic tuning was used on household sets and whether it was used with frequency modulation sets?

A. Yes, I have. [675]

Q. What did you do?

A. I went to various radio stores to ascertain what was on the market, and in what type of sets tuning was used. I went first to a radio store on Broadway, I think it was at 2nd and Broadway, and they didn't have any sets containing automatic tuning. I then went to 7th Street, I went to Schirmer & Company's place of business, and I found that they had automatic tuning on various models, and there was mechanical push-button tuning on Magnovox radios carried by them, and also on Stromberg-Carlson radio sets carried by them. Then I went just a few doors west to the Birkel-Richardson Music Company, and I found that they carried the Stromberg-Carlson line, which as I have already mentioned included mechanical tuning. I went also to Barker Brothers and found that they had radio sets with automatic tuning, and the Hallicrafter set had mechanical automatic tuning. They told me that they also carried——

(Testimony of LeRoy J. Leishman.)

Mr. Lyon: I object to what they told the witness.

The Court: Yes.

A. (Continuing.) I went to the May Company and found in their place of business Stromberg-Carlson receivers with the same automatic tuning to which I have testified. And I went to the Leo J. Myberg Company at the suggestion of the clerk at Barker Brothers to see the RCA line, and I found there on the higher-priced models, the Crestwood line of RCA, [676] that they used mechanical automatic tuning. I saw the tuners in all of these sets using mechanical automatic tuning, and I found that all of them were of the coaxial rocker and tappet type that we have discussed here at the trial, and I found that in the case of the Stromberg-Carlson receiver, the RCA receivers, and the Halli-crafter receivers, that they all used the automatic tuning for frequency modulation, as well as for amplitude modulation, and in advertising matter which I have here it will be observed that they advertised the automatic tuning as used on both types.

Q. Before you produce that advertising matter I would like to ask you one further question: Did you find any mechanically-tuned household sets of any kind which did not use the coaxial tappet and rocker system of tuning?

A. None whatever.

Q. Go ahead with your advertisements.

A. I have here the photographs from the service

(Testimony of LeRoy J. Leishman.)

manual of the Hallicrafter set. I was not able to procure the actual manual because the one that I saw was the only one that the service——

Mr. Lyon: We don't need all that, Mr. Leishman.

Mr. Flam: If there is no objection by opposing counsel, regarding the introduction of these photostats in lieu of the original, we can go right ahead.

Mr. Lyon: I am not interested in holding you to produce [677] the originals if you have photostatic copies. We would like prints, if you have them.

The Witness: Here are the negative prints. These positive prints were made from that negative, I assume.

Q. (By Mr. Flam): What about that manual you were discussing as having pertinence in connection with automatic tuning?

A. On the Hallicrafter set they have two push-button tuners, one on one side of the set for amplitude modulation—I might say that is the type used by the ordinary broadcasting stations, and some other stations in the short wave field use frequency modulation, which is considered to have higher fidelity and to be freer from static; and on the opposite side of the receiver there is a gang of buttons for frequency modulation. The automatic tuner for amplitude modulation has a larger number of leaves in the condenser, and those for frequency modulation are of the same type using fewer leaves, because that is the type of condenser

(Testimony of LeRoy J. Leishman.)

used for higher frequencies. Frequency modulation takes place in higher frequencies. Then these folders show the buttons used.

Mr. Lyon: Never mind telling us what the folders show.

The Witness: Shall I go on with the others?

Mr. Flam: Just a minute.

The Witness: I have checked on the folders, made checks [678] beside the pertinent parts of the various figures.

Q. (By Mr. Flam): You say both of these sheets are from the instruction book or service manual of the Hallicrafter set?

A. That is correct.

Mr. Flam: I offer these sheets in evidence, your Honor.

The Court: They will be received.

The Clerk: Defendant's Exhibit NNN in evidence.

(The documents referred to were marked Defendant's Exhibit NNN, and were received in evidence.)

Q. (By Mr. Flam): Do you have any other advertisement or documents showing the use of automatic tuners of this type?

A. I have actual circulars showing RCA receivers in the Crestwood series, and containing information as to the automatic tuning device which, as I have stated, is used for frequency modulation, as well as amplitude modulation. I made checks beside the pertinent information in these folders.

(Testimony of LeRoy J. Leishman.)

Q. Do you have copies of these for opposing counsel?

A. Those were all I was able to get. In fact, I think in one case——

Mr. Lyon: Have you got copies of them?

The Witness: No, I haven't made any copies of them. I thought that since I had the originals that I wouldn't need to make copies. [679]

Mr. Flam: I offer the three sheets in evidence relating to the RCA household sets.

The Witness: The——

The Court: Don't volunteer anything. They will be received.

The Clerk: Defendant's Exhibit OOO in evidence.

(The documents referred to were marked Defendant's Exhibit OOO, and were received in evidence.)

Q. (By Mr. Flam): You say you saw the tuner devices of these radio sets that you have testified about? A. That is correct.

Q. Have you anything further in connection with push-button tuning that you would like to show?

A. I have other folders here regarding other sets that I saw. I have a folder here regarding the Magnavox receivers, the inside of the back cover mentions the push-button tuners, and I made a check by the pertinent information.

Mr. Flam: I offer the pamphlet in evidence.

(Testimony of LeRoy J. Leishman.)

The Court: It will be received.

The Clerk: Defendant's Exhibit PPP in evidence.

(The pamphlet referred to was marked Defendant's Exhibit PPP, and was received in evidence.)

Q. (By Mr. Flam): Do you have anything further?

A. I have another original folder on the Stromberg-Carlson sets, and I have made check marks beside the pertinent [680] information regarding the models containing push-button tuning.

Q. And those are the push-button tuning devices that you saw in the Stromberg-Carlson set?

A. That is correct.

Mr. Flam: I offer the circular in evidence.

The Court: It will be received.

The Clerk: Defendant's Exhibit QQQ in evidence.

(The circular referred to was marked Defendant's Exhibit QQQ, and was received in evidence.)

Q. (By Mr. Flam): Can you state what other sets in the past have used the coaxial tappets and rockers of the type we have been talking about here?

Mr. Lyon: I object to that as not rebuttal, your Honor.

The Court: We have been over that before, I think. Objection sustained.

(Testimony of LeRoy J. Leishman.)

Mr. Flam: I think, your Honor, that on direct the testimony was to the effect of tuners used immediately after the Leishman patent was issued, and I don't think there is any evidence offered to the extent of the use between that time and the present. The plaintiff has offered evidence through Mr. Schwarz that this particular type of device is going very much into discard. We want to tie up the period right after the Leishman patent issued to the present, as to the sets that have used this particular method of tuning. [681]

The Court: Well, there may be some phase of it that is rebuttal, but the question is too all-inclusive. There is some evidence in the record by Mr. Leishman as to the use of instrumentalities of the type that you have just now described, and there is also testimony on behalf of the plaintiff in opposition to it. I am not going over that thing again, because it wouldn't make it any stronger if it was stated twice than if it was stated once and credibly stated once.

You might look over the transcript during the noon hour and see if you can't get your questions in shape so that you can rebut the phase that you think there isn't any evidence by him on the case in chief. I think there is a good deal of it, myself. 2:00 o'clock, gentlemen.

(Whereupon, at 12:05 o'clock p.m. a recess was taken until 2:00 o'clock p.m. of the same day.) [682]

Los Angeles, California

Thursday, June 3, 1948, 2:00 P.M.

The Court: You may proceed, gentlemen.

Mr. Flam: Mr. Leishman, will you take the stand?

LeROY J. LEISHMAN

called as a witness by and on behalf of the defendant, having been first duly sworn, was recalled and testified further in rebuttal as follows:

Direct Examination
(Rebuttal Continued)

By Mr. Flam:

Q. I want to call your attention to the testimony of Mr. Schwarz given on Wednesday, June 2nd, relating to the use of automatic mechanical tuners in household radio sets at page 384 of the record. The question was asked:

“Can you testify, based on your own knowledge in the industry and this Zenith tuner like Exhibit H, why tuners of that type did not continue in use in household radios?

“A. Yes, I think I can.

“Q. Will you please do so?

“A. A restraining reason was first the problem in superheterodynes to produce them in mass production. I had in mind spurious responses, things that have nothing to do with the mechanical positioning of shafts, but have to do with producing superheterodynes in the first place. So we had problems like [683] spurious responses, we had

(Testimony of LeRoy J. Leishman.)

problems such as electrical drifts with temperature and humidity, in other words, you tune the radio set, and as the set heated up or after you tuned it it would change to a new position, either due to humidity or temperature, or slight mechanical shock. We had problems of electrically tracking circuits, and that was one restraining reason why no mechanical tuner was considered except for custom-built and higher priced radios.”

And then he goes on to say:

“The second reason that was advanced to us in the engineering department by sales and management, and we came to the same conclusion, was that if we were going to go to the expense of automatic tuning we should first consider the possibility in household sets of providing remote tuning, and remote tuning just about calls for electric tuning of some kind, and that is why electric tuners first appeared and remote tuners appeared in the higher priced models.

“Then the third reason was that it was considered not too important in household to have a tuner which could have the settings changed, because once a set was used in a given locality the settings could be made, and it wasn’t too important to change them to new stations. The RCA, Philco, and Zenith, [684] the three largest manufacturers of household radios, made most of their radios with switch type tuners which were not easily adjusted. They could be set up by the service man

(Testimony of LeRoy J. Leishman.)

when installing the set, and they would remain in that position for considerable lengths of time.

“The fourth reason advanced was that push button tuning was of maximum use in an automobile, so that the driver need not divert his attention from the road and could reach over and press a button and bring in a favorite station. But in a household radio if he had to go to the radio set in the first place and tune it, it was almost as easy, they thought, to turn a knob as to push a button. The value of push button tuning was less.”

Now, is it true that mechanical automatic tuners for household sets did not continue in use after the Zenith-Schaefer tuner was discontinued?

A. No.

Mr. Lyon: I think Mr. Schwarz testified that it didn't continue at all.

The Court: Counsel has a right to propound his question. You can argue the matter in your briefs later on. Answer the question.

The Witness: It didn't continue immediately but it [685] came back into use.

Q. (By Mr. Flam): Was the coaxial rocker and tappet type of tuner used after the Zenith tuner was discontinued? A. Yes, it was.

Q. And in what sets were they used?

A. You mean household sets?

Q. Yes, household sets.

Mr. Lyon: Now, I object to that on the ground it is not rebuttal. He testified to that on his case in chief.

(Testimony of LeRoy J. Leishman.)

Mr. Flam: As I remember it, your Honor, we tried to have Mr. Leishman testify as to the volume and not the matter of sets—the volume of tuners.

The Court: Objection overruled.

The Witness: They were used in Crosley sets manufactured by the Crosley Corporation; Spartan sets manufactured by Sparks-Withington. Emerson sets. These are all household sets, of course. Emerson sets, manufactured by the Emerson Radio Corporation. Packard-Bell sets manufactured by Packard-Bell here in town. Mission-Bell also of Los Angeles. Gilfillan Brothers, Incorporated of Los Angeles. The sets made by Radio Corporation of America. The Traveler. I am not familiar with the exact corporate name. Silvertone sets made for Sears-Roebuck by the Colonial Radio Corporation. Arvin radios made by Noblett-Sparks. Admiral radios made by Continental Radio, and [686] Television Corporation. Magnavox radios. Stromberg-Carlson; Hallicrafter. The Detrola set; sets made by the Clinton Manufacturing Company of Chicago. Sets made by the Warwick Manufacturing Company of Chicago.

Sets made by Stewart-Warner of Chicago. Sets made by the Westinghouse—these were Westinghouse sets. I am not sure of the name of the company. Dewald Radios and Troy Radios.

Q. (By Mr. Flam): Now in your earlier experiments with automatic tuning did you use condensers for that purpose? A. Yes.

(Testimony of LeRoy J. Leishman.)

Q. Did you use the regular available condensers on the market?

A. Well, I used the regular available condensers but not as they were available.

Q. How did you have to change them?

A. It was necessary on any automatic tuner to keep the pressure on the buttons as low as possible, so I reduced the torque or the force required to move the condensers by means of a set screw on one end of the condenser and then also I removed a spring that many of the condensers have—many of the condensers provide a leaf spring to provide a certain amount of tension and an electrical contact with the rotor. I took these leaves off and reduced the tension of [687] the spring and then replaced the tension of the spring on the condensers.

Q. Do you know what other manufacturers did about the torque or restraining force of the condensers when automatic tuners first appeared?

Mr. Lyon: That just calls for a yes or no answer.

The Witness: Yes.

Q. (By Mr. Flam): What did they do?

Mr. Lyon, Sr.: I object to that until a foundation is laid as to how he knows.

The Court: Yes.

Q. (By 'Mr. Flam): How do you know what these manufacturers did?

A. I know in two ways. From information they gave me which perhaps would be classified as hear-

(Testimony of LeRoy J. Leishman.)

say, but I examined the condensers in the sets and found that they were of the so-called zero torque.

Mr. Lyon, Sr.: Just a moment. I would like to know what sets and at what time.

Q. (By Mr. Flam): Do you know what sets you examined and where?

A. I examined Packard-Bell sets, Mission-Bell sets, Crosley sets, and the sets made by the Belmont Radio Corporation of Chicago.

Q. And as a result of that examination can you state [688] what the manufacturers did in connection with the torque of the condensers?

Mr. Lyon, Sr.: I don't see how looking at the set you can tell what the manufacturers did. He can state what he found in the set that he examined.

Q. (By Mr. Flam): I will re-phrase the question. What did you find in these sets that you examined?

A. I found that the sets were a very low torque. It took very little pressure to move the condensers.

Q. Do you know of any manufacturers who used such condensers in automatic tuning in automobile tuning sets? A. Crosley Corporation.

Q. Any others?

A. I can't be sure of that.

Q. And what about the household sets?

Mr. Lyon: I object to that. That has been fully covered.

The Court: You have been over that.

Q. (By Mr. Flam): Do you have any way of

(Testimony of LeRoy J. Leishman.)

comparing the force that must be exerted to turn a condenser or other tuning device?

A. I have a device for testing tension in ounces and fractions of ounces.

Q. You mean forces like a spring balance except that you compress the spring and read the force on the barrel? [689]

I think this is a rather well known weight measuring or force measuring instrument.

The Court: I don't know whether it measures torque or not.

Mr. Flam: It measures force and I think I can get the witness to state how he uses it. [690]

Mr. Flam: As far as the accuracy of this instrument is concerned, we are going to use it primarily for comparing the readings of the force required to move these condensers rather than necessarily micrometer measurements of values.

The Court: Of course, anything that is comparable would assist. I don't know, I am frank to say, whether an instrument that measures force, per se, is capable of measuring with precision the torque. It is not necessarily force applied directly, but it is a twisting.

Mr. Flam: Your Honor is absolutely correct, the torque can be expressed as a resistance against turning. If, however, we apply a certain force at the same distance from the center, then a measure of the force is a measure of the turning resistance.

Of course, the longer you make your lever the

(Testimony of LeRoy J. Leishman.)

easier it is. You could move the world if you had a lever long enough.

The Court: I don't know what the witness would say. Possibly these gentlemen can do it. I am satisfied I can't do it.

Mr. Lyon: The testimony has been in inch ounces, and I wonder if the witness in using his spring device could use it in conjunction with this balance here so that he could read the readings in inch ounces.

Mr. Flam: The difficulty with using an instrument of [691] this character is that you just about have to dismantle the whole set. I think I can go about this in another way.

Q. (By Mr. Flam): I will ask the witness first of all what factors enter into the amount of force that you use to push buttons for tuning a radio set.

A. The factors that enter into the force required to depress a button on a radio set, for an automatic tuner, I assume you mean, are five. There are five different factors.

First, you must rotate the condenser, if it is the condenser type; or if it is the permeability type, you must move the cores in and out of the coils.

Second, if the condenser is coupled by gearing or string with the treadle bar, you must overcome the friction in the coupling means.

Third, if the manual drive is coupled with the tuner proper, by which I mean the condenser or the permeability tuner, you must drive that manual knob.

(Testimony of LeRoy J. Leishman.)

And then a fifth item is the force required to drive the dial.

I may have these numbered wrong. But another item is the force required to drive the dial. And still another item that enters into it is the spring that returns the button to its rest position. You must overcome the tension of that spring.

So all of these factors enter into the amount of pressure [692] required on a button in a push-button tuner.

With respect to the condenser, I think that is of some importance to notice just in what way the resistance to turning of the condenser, or as it is generally termed in the radio industry, the torque of the condenser—this term is used rather loosely, they sometimes speak of the pressure on the button as the torque—of course, torque actually is the resistance to turning on the part of any rotatable member, but it is used rather loosely in the automatic tuning art. If a condenser must rotate through 180 degrees, and if pressure were to be applied one inch from the axis of rotation of the turning shaft, and if that pressure is to rotate the rotary blades of the condenser through a semicircle or 180 degrees, as was the case with most of the early automatic tuners, then it is necessary to apply that force through a distance equal to two inches, which would be the diameter of the circle having a one-inch radius, times π , and then divided by 2, that would give the total periphery, or the total distance through which

(Testimony of LeRoy J. Leishman.)

a point one inch from the axis of rotation would move, and that will be slightly in excess of three inches.

Now, if the button were to move a half inch, if the button were to do nothing else but move the condenser, the movement of the button would only be $1/6$ of the total movement of the force on the condenser blades if the condenser [693] blades were to turn through an arc of 180 degrees. So if we had, say two ounces, if it took two ounces to move the condenser blades, two ounces applied one inch from the center, it would take 12 ounces on the button. That is worked out in inch ounces. However, in automatic tuning the button usually moves about $5/8$ of an inch. So whatever pressure is required one inch from the center to turn a condenser would require about 5 times that much pressure on the button, for no other purpose than to move the condenser. But then there are a good many other factors as we have mentioned, too.

Q. How do you propose to proceed to make a comparison of the resisting torque of the various models that have been introduced in evidence? I speak specifically of many of the General Motors models, as well as Model Exhibit 11. Can you explain to the court how you propose to make the comparison measurements?

A. I propose to make measurements by pressing on the condenser at a point as near as we can meas-

(Testimony of LeRoy J. Leishman.)

ure or approximate one inch from the center of rotation. I think, so that this will be as intelligible as possible, that we should begin with some condensers or tuners that have as little as possible connected to them, and then we can see how the force builds up when additional things are added.

Mr. Lyon: Your Honor, is it necessary to take all this [694] time?

The Court: Let's take one. We won't take more than one.

Q. (By Mr. Flam): Here is Exhibit 7. Can you make the measurement that you are talking about?

Mr. Lyon: I don't see how you can measure the condenser torque on that. It hasn't got a condenser on it.

The Witness: This isn't a condenser torque; this is just the torque required to move this.

This has no rotating knob on it that requires any large number of revolutions, so the tuning knob on this device, Plaintiff's Exhibit 7, the manual knob, adds no torque to it. But there is a coupling, of course, between the permeability tuners and the treadle bar, and this force is applied to the treadle bar at a distance approximately one inch from the center. The force will be pressed against the rotatable member through the linkage about one inch from the center. Now, in using this device it is necessary to observe how high the pointer moves when the motion begins to take place.

Q. Hold it as straight as possible.

(Testimony of LeRoy J. Leishman.)

A. It is a pretty difficult thing to hold that straight. It is hard to observe both. It is moving already. That position on the scale is about one ounce. One ounce is all that is required to move that. With this type of tuning, of course, not so much pressure is required because it takes [695] only a small amount of movement to drive the whole tuning mechanism. These cores move in and out approximately one inch. I think it is a little less than one inch. They protrude about $15/16$, and they go in all the way but about $1/16$, so there is about $7/8$ movement.

Q. Will you make the same type of measurement on Plaintiff's Exhibit 6?

A. On this device in the condition in which we find it now the cord to the dial has been disconnected, but when you press on the button the pressure is released that moves the cores in and out. There is a brake on model 6 which normally keeps the device from moving. That, I assume, is to keep jars from throwing the set out of tune. As soon as you press on the button so that the automatic tuner will operate that brake is removed. But it will be noticed when the cores are moved in and out the manual knob rotates around, so that additional factor of load is added on this tuner, and the tuner otherwise is substantially the same, so far as the permeability tuner is concerned, as the arrangement on Plaintiff's Exhibit 7.

This, of course, will require higher torque. I have got the job now of holding a button down——

(Testimony of LeRoy J. Leishman.)

Mr. Lyon: I will hold it down. Which one?

The Witness: Any one. Just hold the button down a little way, and don't engage the rocker. Now, we will see [696] if we can make this move. (Demonstrating.) There, it started to move. That was between two and three ounces.

Now I would like to apply that test to——

Mr. Lyon: How far out from the center was that last?

The Witness: Yes, we should have that information.

Mr. Flam: I thought you said it was the same as the other. That is why I didn't ask it.

The Witness: I don't mean that that was the same.

Mr. Flam: Measure the distance, then.

The Witness: Yes, we should measure the distance. That is substantially an inch to—where this rod moves back and forth where we applied the pressure is substantially an inch from the axis of rotation of the rocker.

Q. (By Mr. Flam): Will you make the same type of measurements on Defendant's Exhibit LL?

A. On this tuner we have a gear between the tuner proper and the manual drive, which adds considerable force to the turning moment, but we have got to drive that. This is going to be a little difficult to find a place exactly one inch from the center, but it appears that if we press right in the middle of the brass plates on Defendant's Exhibit LL, that

(Testimony of LeRoy J. Leishman.)

we will have a place about one inch from the center. I am going to try and apply this at right angles to the condenser. (Demonstrating.) It is hard to hold this out steady. [697]

Mr. Schwarz: May I help you hold it?

The Witness: Yes, please. It is hard to see when it moves. There. I wasn't able to observe the reading at the time it moved on the scale. I took my eyes away. Maybe I can feel it move this time and I will keep my eye on the scale. (Demonstrating.) About three ounces. That would be three inch ounces, providing the scale is accurate. But we are using the same scale on all these models, so any inaccuracies will automatically cancel out.

Q. (By Mr. Flam): Make the same measurement on this exhibit, Defendant's Exhibit HH.

A. I would like to mention, of course, that we were driving the gears connected to a rotating knob when that torque was measured.

This device is Defendant's Exhibit HH, and it contains the condenser——

Mr. Lyon: I think that is all in the record. All you have to do is measure it.

The Court: It is apparent it has a condenser in it.

The Witness: The condenser and the rocker of the treadle bar and the gearing connection between the rocker and the condenser. To get a place one inch from the center on this device we will have to press right out at the edge of the blades, so this reading, since we can't get right at the edge of the

(Testimony of LeRoy J. Leishman.)

blades will be slightly high, because—— [698] let's turn it straight up and I think we can observe it better. (Demonstrating.) That is two ounces. We are turning all that connected mechanism in Defendant's Exhibit HH.

Q. (By Mr. Flam): I hand you Defendant's Exhibit BB, a Crosley tuner; can you make the same measurement with that?

A. This is the Crosley tuner Defendant's Exhibit BB, and connected in this device we have the condenser, the rocker or treadle bar, as it has sometimes been referred to because it moves like the treadle of a sewing machine, and of course the gears connecting the two. There is something that is rubbing here. The rocker seems to touch the desk. Maybe we can put it in this position and it will be all right. Yes, that's free. Now we are going to be pressing down, and we will have to get the scale in a different position for a zero reading to start with.

Q. (By Mr. Flam): Are you an inch from the center of that condenser?

A. I haven't measured that yet. We are a little less than an inch; we are about 15/16 from the center of this device.

Q. To the outer edge of the plate?

A. Yes, the furthest point out where we can apply this. [699]

I wonder if we can put it up here so that all of us can see it better. (Demonstrating.) That was about one ounce. I think there is something the matter with that reading. That must be more than

(Testimony of LeRoy J. Leishman.)

an ounce. I don't want to take any unfair advantage here. Let me see if there is any other factor entering into this. I don't see, offhand, how there could be. (Demonstrating.) It is between one and two ounces, about an ounce and a half.

Mr. Lyon: Haven't we measured enough of these?

Mr. Flam: Just two more.

Mr. Lyon: I don't understand what they contend for these measurements. We have a lot of measurements here. What do you contend? Are you disputing something that Mr. Schwarz or confirming it?

Mr. Flam: Of course, our contention has been that all of these commercial type of push-button tuners must have a very low—must employ condensers or permeability tuners that will require very little force to move them, as such, so that they would be practical. That is borne out by these measurements.

It will also be pointed out that the exhibit offered for your Honor's information as an exemplar of the device in suit doesn't fall in line with these other devices, and that this Exhibit 5 is not a proper representation of what an automatic tuner should be. [700]

Mr. Lyon: Of course, your Honor, there is nothing in the patent in suit about——

The Court: That is a pure matter of argument by both sides. I think the experiment here has in-

(Testimony of LeRoy J. Leishman.)

licated, through the use of this measuring device or tool, whatever it is, approximately, not precisely, but approximately what the findings were in each experiment. Now, the effect of that as applied to the patent in suit is a matter of argument. [701]

Mr. Flam: That may be, but we would like to have figures comparing the force required to move the condensers in these various models. There is only one other, I believe.

The Court: If there is only one other you may proceed.

Q. (By Mr. Flam): I am handing you Exhibit X. A. Defendant's Exhibit XX.

Mr. Lyon: I don't think we need to describe these models again. He can just make the measurement.

The Witness: It is important to, it seems to me, to show what is being turned because if we don't have some basis as to what is being turned it is hardly a fair comparison.

The Court: Exhibit XX is a copy of the patent application.

Mr. Flam: No, this is Exhibit X.

The Court: A single X?

Mr. Flam: Yes.

The Court: The witness called it XX.

The Witness: Pardon me. It is X. There is one X right above the other. This tuner has a string drive between the condensers and the rotatable part of the automatic tuner and it also has a dial con-

(Testimony of LeRoy J. Leishman.)

nected and the force can be applied about $\frac{7}{8}$ ths of an inch from the center, so this reading will be a little higher than it would be if we were [702] to place it out an inch away from the center. That is moving with slightly over one ounce of pressure.

Q. (By Mr. Flam): Now, can you take Exhibit 5 purporting to be an exemplar of the disclosures or patent in suit and apply the measurement to it?

A. Yes. One of the condensers, I might say, on this device turns quite easily and possibly within these limits. The other one is much harder to turn. On this condenser if we apply the pressure right at the edge of the little plastic strip it will be about an inch from the center. This is the easy running condenser—the easiest of the two and it is less than an ounce. This other condenser which is connected through gearing to the treadle bar, this would be applied about $\frac{7}{8}$ ths from the center—as far out as we can place it so the pressure would actually be slightly less if we had it out one inch. It takes about four ounces on that just to move the condenser and the treadle as compared between one and two ounces on some of the other devices.

Mr. Lyon: If you converted that to one inch what would it amount to?

The Witness: We were measuring it one inch.

Mr. Lyon: I thought you were measuring it $\frac{7}{8}$ ths inch out.

Mr. Flam: $\frac{7}{8}$ ths is what you said. [703]

The Witness: It would be $\frac{7}{8}$ ths of that pressure.

(Testimony of LeRoy J. Leishman.)

Mr. Flam: It is a matter of arithmetic, isn't it?

The Witness: It would be about three and a half ounces.

Q. (By Mr Flam): Will you compare the locking arrangement on Exhibit 5 with the locking—I mean the locking arrangement for the tappet, compare that locking arrangement in Exhibit 5 with the locking arrangement described in your patent in suit, Exhibit A?

A. I haven't a copy of the patent here, incidentally.

Q. Just a minute. I will hand you one.

A. On this device I notice that the clamp is arcuate in form.

Q. You mean the part of the clamp that engages the——

A. ——is arcuate in form on the bottom and engages the collar of the tappet? While on the patent it is shown to have a V-shape. It will be noted that parts of this figure are shown in dotted lines. Of course, it is customary in any mechanical drawing to have portions that are hidden shown in broken or dotted lines. The tappet is shown in a circle which is concentric, of course, with the center, and it will be noted at the top that the lines of the circle continue an additional line extending upwards to the figure 68 at the top on the right, and there is another additional line at the left which comes up to a point. They are the portions [704] of the dotted line—two dotted lines forming the V-shaped

(Testimony of LeRoy J. Leishman.)

part of the bottom of the lock. That makes considerable difference in the operation of the lock as can be shown by a lock on one of the other exhibits in which the V-shape is followed.

Q. You mean Exhibit M?

A. Exhibit M, yes.

Q. Will you compare the amount of restraint of the two models?

A. We can lock them both up and we may be able to determine the force required to turn them—the tappets, when we have them as tight as we can get them with our fingers. I don't know whether we can measure that or not.

Mr. Lyon: I don't think we ought to be experimenting. The witness seems to agree with Mr. Schwarz that the V-notch makes a substantial difference. I don't think it makes any difference in the case to measure just how much or to take the time of the court to find out whether you can measure it or not.

Q. (By Mr. Flam): Can you make a demonstration there in the difference of the clamping effect? That is all we want.

A. The force required to turn the tappet on Defendant's Exhibit M is so great that these devices wouldn't possibly measure it. I think that if someone in comparing these were [705] to try manually to turn one with his fingers and make the same test with the other it would be obvious there is tremendous difference in this respect. And then did

(Testimony of LeRoy J. Leishman.)

you ask me for any other comparison with the patent?

Q. Well, in what other ways does this exhibit 5, Plaintiff's Exhibit 5, vary from the disclosures in the patent?

A. In Figure 2 of the patent the tappet, 61, the axis of the tappet 61 is, or, we will say the pivot on which the axis 61 is mounted, is coaxial with the axis of the rocker, 48, on page 2.

Mr. Lyon: I don't think it is necessary to read the patent.

The Witness: He asked me to compare it with the disclosure of the patent so I wanted to show what the disclosure of the patent was and where the disclosure takes place.

The Court: You can make the comparison without reading from the patent, can't you?

The Witness: Well, it states in the patent that this coaxial relationship must prevail. That is on page 2 in the first column.

Mr. Lyon: I don't see anything that says it must prevail, your Honor.

The Witness: It says it is coaxial. [706]

Mr. Lyon: It is not important whether it prevails. I think he is reading something into the patent.

Mr. Flam: And I think the document will speak for itself. I will leave that for the briefs. No need arguing it now.

The Court: All of this is argument, really, ex-

(Testimony of LeRoy J. Leishman.)

cept the comparison of the models and the explanation of what difference, if any, there appears to be between the models, and also the question as to whether Exhibit 5 is a true replica or true representation of the patent in suit. But the rest is a matter of argument, it seems to me.

Mr. Flam: I think that is so.

The Court: And I am not going to take argument from the witness stand at all.

Q. (By Mr. Flam): Did you find any variation—I notice you were making some measurements.

A. I noticed considerable variation on a previous inspection of this model yesterday, but it appears some of the parts are more or less loose and I am not able to show the variation that I noticed on this yesterday.

The Court: That is Exhibit 5.

The Witness: Yes, on Exhibit 5. I noticed that there was quite a variation from coaxiality when I measured it yesterday. I measured the distance from one side of the tappet to the rocker and the other side, and the variation I [707] noticed yesterday—there is a variation but it is not as pronounced as it seemed to be yesterday.

Mr. Lyon: If you tightened this up would you say that this Exhibit 5, as you now have it before you, is not substantially coaxial within the meaning of your patent?

The Witness: It didn't seem to be when I measured it yesterday but since there seems to be some

(Testimony of LeRoy J. Leishman.)

variation in this for some reason or other I don't think I should make a statement about that. As I measure it right at this moment I would say that it was substantially coaxial. There is slightly more room on one side than the other, but it is not enough, as I measure it now, to be material. I made the same measurements with these calipers yesterday and found a variation, considerable variation.

Mr. Flam: If your Honor please, I would like to ask this witness one or two questions which relate to a tying-in of some of the exhibits that have been before the court in Oklahoma City and which are present here in the form of physical exhibits.

On Finding 17 of the Oklahoma court reference is made to Plaintiff's Exhibit 40 and Exhibit 42. Now, those exhibits are, I believe, substantially the same as two of the exhibits already in this case and I want to ask the witness merely to identify them so that your Honor may know what that finding relates to in the Oklahoma case. [708]

Mr. Lyon: You can tell us, Mr. Flam. You were the attorney in that case. I will take your word for it.

Mr. Flam: Exhibit EE in this case is the same Exhibit 40 in the Oklahoma case, and Exhibit HH in this case is the same as Exhibit 42 in the Oklahoma case.

The Clerk: It is not Exhibit HH.

Mr. Flam: What is Exhibit HH?

Mr. Lyon: It is this thing right here.

(Testimony of LeRoy J. Leishman.)

Mr. Flam: Do you have Exhibit HH in front of you?

The Witness: No.

Mr. Flam: Have you Exhibit EE there?

The Clerk: That is a drawing of a plunger mechanism.

Mr. Flam: The drawing is EE and corresponds to Exhibit 40 in the Oklahoma case.

Mr. Lyon: Which was a physical exhibit or a drawing?

Mr. Flam: It was a physical exhibit.

Mr. Lyon: I am willing to take Mr. Flam's statement for that unless his client wants to contradict him and then I would like to hear what his client has to say.

Mr. Flam: And physical exhibit LL in this case shows the same tuner mechanism as Exhibit 42 in the Oklahoma case.

The Court: It seems to be already covered by the transcript on page 174. That is at least one of them is covered at that page. We are just going over it again. It is more specifically identified there. [709]

Mr. Flam: You may cross-examine.

Cross-Examination

By Mr. Lyon, Sr.:

Q. Mr. Leishman, referring to the Hallicrafter set which you referred to in your direct examination as having push buttons, do you know whether or not that was equipped with A.F.C.?

(Testimony of LeRoy J. Leishman.)

A. No, I do not.

Q. As a matter of fact, the only radios that you found equipped with automatic tuners on this inspection you made in the last few days, were the high priced sets, were they not?

A. I think in general that is true, but I am not sure of the price of the Hallicrafter. It wasn't a very large set. Whether it was a high priced set I don't know, but that is true of all the others.

Q. Did you find any set, any radio set selling for less than \$100.00 on this inspection that had automatic tuning on them?

A. Not that I remember—not that I recall.

Q. You did find in these various stores that you went to see a large number of different types and models and makes of household radios that did not have automatic tuning on them, did you not?

A. That is correct. [710]

Q. This first store that you went to see on Broadway, you said you didn't find any radios there with automatic tuning. What radios did you find there without automatic tuning?

A. Well, they had quite a few sets. They looked like they were second-hand sets but I am not sure about that.

Q. What sets did you see?

A. I don't remember the names of any of them. I inquired if they had any and they said they didn't and I checked on the clerk's statement by looking around the store and I probably wasn't in the store over three or four minutes.

(Testimony of LeRoy J. Leishman.)

Q. Now, when you went over to Barker Brothers and found this—no, when you went down to Mybergs and found this Crestwood series of RCA—that is the most expensive RCA series, is it not?

A. Yes. They told me that was the best set they had.

Q. And about how much does one of those sell for?

A. I don't know but they told me they were their highest price and best models.

Q. And there were many other models of RCA sets there, were there not? Cheaper sets?

A. Yes. Of course "many" is a very indefinite term. I will say there were more without automatic tuning than there [711] were with it.

Q. You found that was very much the case as a result of your entire inspection in the last few days, was it not, that there are a great many more household sets now sold without automatic tuning than with automatic tuning?

A. Yes, that is correct.

Q. You stated that you have known of a Crosley model with automatic tuning, in your direct examination. Do you mean to say that all Crosley models had automatic tuners?

A. I think that on the line that they put out in 1938 and 1939 almost their entire line did. I can't state definitely that their entire line did, but they had them on very low priced receivers.

Q. For how long?

(Testimony of LeRoy J. Leishman.)

A. Two years at my knowledge—for two years of my knowledge.

Q. You haven't any knowledge of whether Crosley has automatic tuning on their models since 1940?

A. No. I am not familiar at all with any Crosley set manufactured since then. I don't think I have seen one.

Q. Can you answer the same question as to Sparton?

A. Yes. I am not familiar with what they have done since 1940.

Q. Emerson?

A. Let me qualify those answers. I am not familiar [712] with what any of them have done since the—I will not say any of them, but when I am answering your specific questions here my answers will be as to what I know about their lines since the manufacture of radios was stopped by Federal order in April of 1942.

Q. And you don't know anything about any of these sets since that time?

A. Excepting those that I testified as having seen on a survey that I made during the last few days.

Q. So when you testified to this long list of household models that you knew of as having automatic tuning on them your testimony related to knowledge of those sets prior to this date in 1942 that you specify?

A. That is correct.

(Testimony of LeRoy J. Leishman.)

Q. In all cases of those different makes did you mean to say that the entire line was equipped with automatic tuning or just some models?

A. Just certain sets in their line that those manufacturers made. They had sets in their line that included automatic tuning.

Q. But they also made other models in their line that did not have automatic tuning, is that correct?

A. That is correct. In some cases models—most models either had automatic tuning and in other cases the majority didn't.

Mr. Lyon: I think that is all, your Honor. [713]

* * *

CERTIFICATE

I hereby certify that I am a duly appointed, qualified and acting official court reporter of the United States District Court for the Southern District of California.

I further certify that the foregoing is a true and correct transcript of the proceedings had in the above-entitled cause on the date or dates specified therein, and that said transcript is a true and correct transcription of my stenographic notes.

Dated at Los Angeles, California, this 3rd day of June, A.D. 1949.

/s/ J. D. AMBROSE,

/s/ SAMUEL GOLDSTEIN,

Official Reporters.

[Endorsed]: Filed July 29, 1949.

[Title of District Court and Cause.]

CERTIFICATE OF CLERK

I, Edmund L. Smith, Clerk of the United States District Court for the Southern District of California, do hereby certify that the foregoing pages numbered from 1 to 398, inclusive, contain the original Complaint Counterclaim of Defendant; Bill of Particulars; Plaintiff's Reply to Defendant's Counterclaim; Defendant's Answer; Memorandum Opposing Defendant's Motion for Summary Judgment; Defendant's Interrogatories Under Rule 33; Plaintiff's Answers to Defendant's Interrogatories; Trial Brief on Behalf of Plaintiff; Plaintiff's Supplemental Reply Brief; Conclusions of the Court and Memorandum of Decision; Findings of Fact and Conclusions of Law; Final Judgment; Motion Under Rule 52b to Amend the Findings, Conclusions and Judgment and Motion for a New Trial Under Rule 59 and Affidavits in Support; Order Denying Motions Filed September 19, 1949; Notice of Appeal; Tender of Cash Deposit in Lieu of Bond on Appeal; Order Under Rule 73(g) F.R.C.P.; Designation of Contents of Record on Appeal; Defendant's Supplemental Designation of Contents of Record on Appeal; Counter-Designation of Contents of Record on Appeal; Defendant's Second Supplemental Designation of Contents of Record on Appeal; which together with reporter's transcript of proceedings on May 25, 26, 27 and 28 and June 2 and 3, 1948; Original Defendant's Exhibits A, B, C, D, E,

E-1, F, G, H, I, J, K, K-1, L, L-1, L-2, L-3, L-4, M, N, O, P, Q, R, S, T, U, V, W, W-1, X, Y, Z, AA, BB, EE, FF, GG, HH, II, JJ, JJ-1, KK, LL, LL-1, MM, NN, OO, PP, QQ, RR, SS, TT, UU, VV, WW, XX, YY, ZZ, AAA, BBB, CCC, DDD, EEE, FFF, GGG, HHH, III, JJJ, KKK, LLL, MMM, NNN, OOO, PPP, QQQ; Original Defendant's Original Exhibits A, F, and FA; Original Plaintiff's Exhibits 1, 2, 3, 4, 5, 5-A, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17 and 18; and Original Volumes 1 and 2 of the Transcript of Record on Appeal in the Richards and Conover Company vs. LeRoy J. Leishman, case in the United States Court of Appeals for the Tenth Circuit, transmitted herewith, constitute the record on appeal to the United States Court of Appeals for the Ninth Circuit.

I further certify that my fees for preparing and certifying the foregoing record amount to \$2.80 which sum has been paid to me by appellant.

Witness my hand and the seal of said District Court this 24th day of February, A.D. 1950.

EDMUND L. SMITH,

Clerk.

[Seal] By /s/ THEODORE HOCKE,
Chief Deputy.

[Endorsed]: No. 12485. United States Court of Appeals for the Ninth Circuit. LeRoy J. Leishman, Appellant, vs. General Motors Corporation, Appellee. Transcript of Record. Appeal from the United States District Court for the Southern District of California, Central Division.

Filed February 27, 1950.

/s/ PAUL P. O'BRIEN,

Clerk of the United States Court of Appeals for the Ninth Circuit.

In the United States Court of Appeals for the
Ninth Circuit

No. 12485

LeROY J. LEISHMAN,

Defendant-Appellant.

vs.

GENERAL MOTORS CORPORATION, a Corporation,

Plaintiff-Appellee.

STIPULATION DESIGNATING CERTAIN
DOCUMENTARY EXHIBITS TO BE
PHYSICAL EXHIBITS FOR THE RECORD
ON APPEAL

It Is Stipulated by and between counsel for the respective parties that defendant's documentary exhibits K, R, U, W-1, OO, TT, UU, BBB, CCC,

DDD, EEE, NNN, OOO, PPP and QQQ, and Volume 1 and 2 of the Transcript of Record on Appeal in The Richards and Conover Company v. LeRoy J. Leishman in the United States Court of Appeals for the Tenth Circuit, filed with plaintiff's supplemental brief, because of their size, number of pages and cost of printing, shall constitute physical exhibits for the record on appeal; and all of these exhibits shall be considered by the Court in their original form as though set out in the printed record.

/s/ JOHN FLAM,
Attorney for
Defendant-Appellant.

LYON & LYON,
By /s/ LEONARD S. LYON, JR.,
Attorney for
Plaintiff-Appellee.

[Title of Court of Appeals and Cause.]

STIPULATION RE BOOK OF EXHIBITS

The parties to this appeal, through their respective counsel, hereby stipulate that the Clerk of the Court shall cause to be printed sixteen (16) copies of the Book of Exhibits which shall include plaintiff's and defendant's documentary exhibits specified as follows:

Defendant's Exhibit A: U.S. Patent No. Re. 20,827.

Plaintiff's Exhibit 17.

Defendant's Exhibit Q: U.S. Patent No. 2,108,538, which was reissued as the patent here in suit.

Defendant's Exhibit P.

Defendant's Exhibit O.

Defendant's Exhibit B: Heath Patent No. Re. 17,531.

Defendant's Exhibit C: Jacke Patent No. 2,297,-152.

Defendant's Exhibit D: Kettel Patent No. 290,-894.

Defendant's Original Exhibit F, filed with Motion for Summary Judgment: Certified Translation of Philips Danish Patent No. 52,047.

Defendant's Original Exhibit Fa, filed with Motion for Summary Judgment: Photostatic copy of Philips Danish Patent No. 52,047.

Defendant's Exhibit E-1: Marschalk Patent No. 2,072,897.

Defendant's Exhibit J: Soffietti Patent No. 2,388,-581.

Marvin Patent No. 1,704,754, from Book of Patents, Defendant's Original Exhibit A, filed with Motion for Summary Judgment.

Defendant's Exhibit S: Fitz Gerald Pat. No. Re. 20,357.

Defendant's Exhibit T: Enderwood Patent No. 1,834,272.

Defendant's Exhibit V: Page 21 of Radio Retail Magazine.

Defendant's Exhibit Y: Leishman Patent No. 2,163,343.

Defendant's Exhibit Z: Crowe 1937 License Agreement.

Defendant's Exhibit AA: Allen and Allen Letter.

Defendant's Exhibit GG: Crowe 1938 License Agreement.

Defendant's Exhibit PP: Page 41 of Elements of Alternating Currents.

Defendant's Exhibit QQ: The designated pages from Dictionary of Applied Physics.

Defendant's Exhibit RR: Page 30 of Electrical Measurements.

Defendant's Exhibit VV: Certified copy of pages from Jacke file wrapper.

Defendant's Exhibit WW: Leishman Letter to James and Franklin.

Defendant's Exhibit XX: Patent Office Action Citing Marschalk Patent.

Defendant's Exhibit FFF: Bulletin of Zenith Corporation.

Defendant's Exhibit HHH: Bast Pat. No. 1,687,-420.

Defendant's Exhibit III: Faas Pat. No. 1,928,200.

Defendant's Exhibit JJJ: Peck Patent No. 1,865,-704.

Defendant's Exhibit KKK: Vasselli Pat. No. 1,846,289 Re. 17002.

Defendant's Exhibit LLL: Bird Pat. No. 1,925,-651.

Defendant's Exhibit MMM: Morin Pat. No. 1,-828,197.

Defendant's Exhibit K-1: Drawing from Lane and Mackey File Wrapper.

Plaintiff's Exhibit 1: James and Franklin Letter to Leishman.

Plaintiff's Exhibit 2: Leishman Letter to Radio Industry.

Plaintiff's Exhibit 4.

Plaintiff's Exhibit 8: Woodbridge Pat. No. 585,-996.

Plaintiff's Exhibit 9: Miller Pat. No. 2,014,358.

Plaintiff's Exhibit 10: Cunningham Pat. No. 1,-930,192.

Plaintiff's Exhibit 18: Schaefer Pat. No. 1,906,-106.

The following designated portion of plaintiff's Supplemental Reply Brief:

Page 10 of the Appendix, line 5, to page 11, line 7.

The drawing occupying page 12 of the Appendix.

Two (2) copies of said Book of Exhibits shall be supplied counsel for plaintiff-appellee, and two (2) copies to counsel for defendant-appellant, the remainder to be retained by the Clerk of this Court to form a part of the record on appeal.

Dated this 23rd day of February, 1950.

/s/ JOHN FLAM,
Attorney for Appellant.

/s/ LEONARD S. LYON, JR.,
Attorney for Appellee.

[Endorsed]: Filed Feb. 27, 1950.

At a Stated Term, to wit: The October Term 1949, of the United States Court of Appeals for the Ninth Circuit, held in the Court Room thereof, in the City and County of San Francisco, in the State of California, on Monday the thirteenth day of March in the year of our Lord one thousand nine hundred and fifty.

Present: Honorable Clifton Mathews,
Circuit Judge, Presiding,
Honorable Homer T. Bone,
Circuit Judge.

[Title of Cause.]

ORDER THAT EXHIBITS NEED NOT BE
REPRODUCED IN PRINTED TRANSCRIPT

Upon consideration of the stipulation of counsel for respective parties, and good cause therefor appearing,

It Is Ordered that the original exhibits transmitted as a part of the record on appeal, and marked Defendant's K, R, U, W-1, OO, TT, UU, BBB, CCC, DDD, EEE, NNN, OOO, PPP and QQQ, and Vol. 1 and 2 of the record in "Richards and Conover Co. vs. Leishman, C.A. 10th Cir." need not be reproduced in the printed transcript of record but will be considered by the Court in their original form.

[Title of Court of Appeals and Cause.]

CONCISE STATEMENT OF POINTS UPON
WHICH DEFENDANT - APPELLANT
WILL REPLY AS REQUIRED BY RULE
75(d) F.R.C.P. AND RULE 19(6) OF THIS
COURT

Pursuant to, and in accordance with, Rule 75(d) F.R.C.P. and Rule 19(6) of this Court, notice is hereby given that at the hearing of this appeal the defendant-appellant will rely upon the following points:

1. That the district court erred in finding that claims 7, 8, 9, 10, and 11 of United States Reissue Letters Patent No. 20,827 are invalid and void.

2. That the district court erred in making Finding 8 to effect that "Every element, feature and mode of operation of the tuner of the patent in suit is anticipated in the light of the teachings of Marschalk, Patent No. 2,072,897 and Schaefer, Patent No. 1,906,106."

3. That the district court erred in stating, in Finding 9, that "the co-axial characteristic of the patented tuner is anticipated by said Schaefer patent . . ."

4. That the district court erred in stating, in Finding 9, that the "function and mode of operation" of the Schaefer device "is identical with that of the patented tuner."

5. That Findings 8, 9, and 10, and the portions of the opinion upon which they are based, have no

support whatever in the record, and are contrary to all the expert testimony with respect to the Schaefer and Marschalk devices, which said testimony was undisputed.

6. That Findings 10, 11, and 12, together with the portions of the opinion upon which they are based, are unwarranted assumptions unsupported by the record.

7. That Finding 13 is both incorrect and irrelevant because (1) parts of the Cunningham device that were essential to its mode of operation were omitted from the model, (2) the method of setting the so-called tappet in the model was entirely different from the method that needed to be employed in Cunningham's device, and (3) the Cunningham device is from a non-analogous art in which the problem that was solved by the patent in suit never arose.

8. That Finding 14 is in error for the reason that the Cunningham patent is from a different and non-analogous art not encountering the problem that was solved by the patent in suit.

9. That Finding 15 is clearly in error.

10. That the court erred in making Finding 16.

11. That court erred in not holding that the claims at issue are valid.

12. That inasmuch as Judge Mathews, writing for the court in *Leishman v. Associated Wholesale Electric Co.*, 137 F(2) 722, 727, 728, specifically wiped out the lower court's holding that the claims here at issue were invalid for want of invention,

the district court in the instant case is in error in stating that "there are rather significant expressions in the opinion of Judge Mathews, writing for the court in *Leishman v. Associated Wholesale Electric Co.*, supra, that induce at least a surmise that our own Appellate Court had its misgivings as to any inventive qualities in the claims of the patent in suit."

13. That the district court erred in attaching so much weight to the opinion of the Court of Appeals for the Tenth Circuit in *The Richards and Conover Company v. Leishman*, which said Court of Appeals was demonstrably in reversing the U. S. District Court for the Western District of Oklahoma in its holding that the claims here at issue are valid.

14. That the district court erred in denying both Defendant's Motion under Rule 52b to Amend the Findings, Conclusions and Judgment, and Defendant's Motion for a New Trial under Rule 59.

15. That inasmuch as the final opinion of the Court of Appeals for the Tenth Circuit in *The Richards and Conover* case, rendered subsequent to the trial herein, was based upon new grounds raised for the first time in the said appellate court's own opinion, the district court in the instant case was wrong in refusing to grant a new trial for the purpose of introducing evidence to show that said new grounds were baseless and should not be followed here.

16. That inasmuch as Defendant's Motion for a New Trial was supported by affidavits from the professors of mechanical engineering at California Institute of Technology and the University of Southern California, and also from the head of Engineering Research, Department of Engineering, at the University of California at Los Angeles, which said affidavits unanimously stated that the opinion of the Court of Appeals for the Tenth Circuit, *supra*, was based upon erroneous conceptions of mechanical principles, the district court in the instant case should have granted the defendant a new trial to permit him to present evidence to refute the erroneous conclusions of the Court of Appeals for the Tenth Circuit with respect to invention, which conclusions have been adopted herein.

17. That the district court erred in not deciding the issue of validity according to the formulas recommended by the Supreme Court and by this Honorable Court of Appeals for the Ninth Circuit.

18. That the district court was wrong in stating, in its opinion, that the defendant argued that the court should broaden the claims to cover tuners not operated by levers, whereas, actually, the defendant constantly argued that the claims should not be narrowed to lever-operation, and should be interpreted literally. As the Court of Appeals for the Tenth Circuit said in *The Richards and Conover Company v. Leishman*, 172 F(2) 365,368: "However, claims 7 to 11, inclusive, embrace a single rocker and corresponding adjustable tappets

mounted on pivots, means for moving each tappet so one of its sides engages one arm of the rocker and rotates the rocker until the other side of the tappet engages the other arm of the rocker, and they do not specifically embrace a lever means for carrying and moving the tappets.”

19. That the court erred in not holding that both of the plaintiff's accused tuning devices are infringements of the claims here at issue.

/s/ JOHN FLAM,

Attorney for Appellant.

Affidavit of Service by Mail.

[Endorsed]: Filed Feb. 27, 1950.

